City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (0172-33)

September 2023 Version 4.10
(For delivery from September 2023)

Qualification Handbook

Qualification at a glance

Industry area	Animal Care
City & Guilds qualification number	0172-33
Age group	16-19 (Key Stage 5), 19+
Entry requirements	Centres must ensure that any pre-requisites stated in the *What is this qualification about?* Section are met.
Assessment	To gain this qualification, candidates must successfully achieve the following assessments: • Two externally set, internally marked, externally moderated synoptic assignments • Three externally set, externally marked exams, sat under examination conditions • One externally set, internally marked and externally verified exam • One externally set, externally verified unit assignment • Portfolio of evidence • Optional unit assessments, externally set, internally marked, externally verified
Additional requirements to gain this qualification	Employer involvement in the delivery and/or assessment of this qualification is essential for all candidates and will be externally quality assured.
Grading	This qualification is graded. For more information on grading, please see Section 7: Grading.
Approvals	This qualification requires full centre and qualification approval
Support materials	Sample assessments Guidance for delivery Guidance on use of marking grids
Registration and certification	Registration and certification of this qualification is through the Walled Garden, and is subject to end dates.
External quality assurance	This qualification is externally quality assured by City & Guilds, and its internally marked synoptic assignments are subject to external moderation. Additional internally assessed units / optional assessments are subject to external verification. There is no direct claim status available for this qualification.

Title and level	Size (GLH)	TQT	City & Guilds qualification number	Ofqual accreditation number
City & Guilds Level 3 Advanced Technical Diploma in Animal Management (1080)	1080	1800	0172-33	601/7549/7

Version and date	Change detail	Section
1.2 May 2016	Small typographical errors	Throughout
	TQT added for qualifications Assessment component titles amended	Introduction
	Employer involvement guidance updated throughout	4. Employer involvement
	Summary of assessment methods and conditions	5. Assessment
	Moderation and standardisation of assessment updated throughout	6. Moderation and standardisation of assessment
	Awarding individual assessments Awarding grades and reporting results	7. Grading
	Enquiries about results Re-sits and shelf-life of assessment results Malpractice Access arrangements and special consideration	8. Administration
2.1 September 2016	Science Pathway ROC updated	1. Introduction
	Assessment Modules and Test Specification (045) updated	5. Assessment
	Unit content for 326, 327 and 331 updated	Units
3.0 December 2016	Assessment components updated	Introduction
	Units 307, 324 and 328 updated	Units
	Units 301 and 306 assessment type updated to centre marked assignment. Assessment weightings updated.	Introduction Assessment Moderation
3.1 July 2017	Unit 301 Aim updated	Units
	Addition of the examination paper based module numbers	1. Introduction – Assessment requirements and employer involvement 5. Assessment 5. Assessment – exam Specification 7. Grading – Awarding grades and reporting results
	Removal of AO 6-8 from Synoptic Assignments and the readjusted approximate weightings (only if applicable)	5. Assessment – Assessment Objectives
	Revised Exam Specification, Exam Duration and AO weightings	5. Assessment – Exam Specification
	Addition of Provisional Grade Boundaries for the Synoptic Assignment	7. Grading
	Branding Changes	City and Guilds Logo
3.2 August 2017	Example of content/ coverage of year 2 synoptic assignments in weighting table updated	5. Assessments

Version and date	Change detail	Section
3.3 October 2017	Range in unit 313 Aquatics Welfare and Breed Development updated (Topics 1.5 and 2.1)	Units
3.4 November 2017	Amendments made to the learning outcomes for unit 321 in the table for theory exam 045 or 545	5. Assessments
3.5 January 2018	Amendment to summary of assessment methods and conditions table	5. Assessment
4.0 July 2018	Update to grading details Title pathway corrected to read (Science)	Section 7 Throughout
4.1 September 2018	Typographical error	Section 7
4.2 November 2018	Summary of assessment methods and conditions amended for unit 301	5. Assessment
4.3 May 2019	Wording changed regarding retakes	5. Assessment – Summary of assessment methods and conditions 8. Administration – Re-sits and shelf-life of assessment results
4.4 July 2019	Unit content updated to reflect changes in legislation for England only. The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018 has amended or repealed: Performing Animals (Regulation) Act 1925 Pet Animals Act 1951 Animal Boarding Establishments Act 1963 Riding Establishments Act 1964 Breeding of Dogs Act 1973 Dangerous Wild Animals Act 1976 Zoo Licensing Act 1981 Breeding of Dogs Act 1991 Breeding and Sale of Dogs (Welfare) Act 1999	Units 303, 307, 310, 311, 313, 316, 325 and 327
4.6 February 2020	Minor amends	Throughout
4.7 June 2022	Corrected date for Pet Animal Act Changed Licence to Licensing for Zoo Licensing Act Added Microchipping of Dogs regulations	Unit 310 Unit 313 Unit 325
4.8 October 2022	Animal management: optional unit 329 replaced with unit 328	Section 5: Assessment requirements
4.9 May 2023	Amended assessment method for unit 301 Component number for assessment component changed from 301 to 300	5 Assessment
	Clarified moderation and external verification processes	5 Assessment 6 Moderation and standardisation of assessment
	Updated website links and references	3 Delivering Technicals qualifications - Support materials 8 Administration

Version and date	Change detail	Section
4.10 September 2023	Revision to the exam specification for the health and safety test component (300)	5 Exam specification

Contents

1 Introduction

The following purpose statement relates to the **City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080)**

Area	Description
OVERVIEW	
Who is this qualification for?	This qualification is for you if you are 16 years or older and want to work with animals, either directly hands-on or within wider allied services or businesses. It is designed to provide you with a very wide range of specialist technical practical skills and detailed knowledge and understanding which will equip you to seek a diverse range of employment opportunities, or to further learning and training within the animal care and management industries. On successful completion of the qualification, you will be awarded one of the following: City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (Zoos) (1080) or City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (Wildlife) (1080) or City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (Animal Management)(1080) or City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (Science) (1080)
What does this qualification cover?	This qualification gives you the opportunity to learn about and build on the essentials of working with animals. You will learn how to work safely around animals, be responsible for the planning and carrying out animal husbandry health and handling, and feeding and nutrition. You will also learn about animal behaviour, animal breeds and welfare and business skills. You will then choose to specialise in one of the following areas; **zoos, wildlife, animal management** or **science**. Students choosing the zoos option will also learn specific topics such as the health and husbandry requirements of exotic species, avians, aquatics and zoological animals, and customer care plus you could learn further skills such as animal nursing, farm livestock husbandry or inheritance and genetics.

	If you wish to study the wildlife specialism, then you will learn about specific topics such as wildlife ecology and conservation, population surveys and conservation, estate skills, wildlife management and rehabilitation, plus you could learn about further topics such as animal nursing, pest and predator control, habitat management, environmental studies or managing volunteers. Students choosing the animal management option will learn about animal nursing, pet store management, pet allied services and cattery management. You will also learn further skills such as animal training, dog grooming and styling or customer care and retail management. If you have a particular interest in science and animals then you can take the science option. You will learn about the fundamentals of science and the skills required for scientific report writing. You will also study other areas such as 3inheritance and genetics, cell biology, biochemistry and microbiology or fish biology Centres and providers work with local employers who will contribute to the knowledge and delivery of training. Employers will provide demonstrations and talks on the industry and where possible work placements will also be provided by the employers. This practically based training is ideal preparation for gaining employment in the animal care and management industry or specialist further study.
WHAT COULD THIS QUALIFICATION LEAD TO?	
Will the qualification lead to employment, and if so, in which job role and at what level?	This two-year qualification exposes you to the whole industry, and the opportunities within it. On completion, it is likely that you will enter the industry by working within an animal welfare organisation, a veterinary practice, a wildlife park or perhaps a business such as a pet store, feed company or dog grooming salon. As you will have gained a breadth and depth of skills and knowledge over a wide range of units, you could progress within work to become a: **In wildlife pathway** • Wildlife warden • Nature officer • Data recorder • Project officer **In animal management pathway** • Animal Centre/Unit Manager • Animal Centre Deputy Manager

	• Dog grooming business owner/manager • Pet Store Manager • Kennel & Cattery Supervisor/Manger • Pet Sitter • Dog Walker **In zoo pathway** • Trainee zoo keeper • Trainee aquarist **In science pathway** • Research assistant (desk based) • Trainee animal husbandry technician • Lab technician • Veterinary practice lab assistant You may also wish to become self-employed, and undertake roles such as a freelance animal trainer.
Why choose this qualification over similar qualifications?	You are likely to take this qualification full-time over 2 years. You have the option of four separate pathways which will enable you to prepare to enter the many diverse opportunities within animal management, focussing on a broad basis of skills that employer's value, whilst studying in greater depth the areas that will enable you to seek specialised and more demanding job roles. City & Guilds offers four sizes of Level 3 qualification in Animal Management: Certificate, Diploma (540), Extended Diploma (720) and Extended Diploma (1080). You would take the Certificate if you want an introductory qualification to develop some of the core skills and knowledge required by employers in the animal care and management industries. The Certificate is likely to be taken alongside other programmes such as GCSEs or AS Levels over a one-year course of study. You would take the Diploma (540) if you want a qualification to develop some of the skills and knowledge that can lead to specific roles required by employers in the animal care and management industries. The Diploma is likely to be taken alongside other programmes such as GCSEs or AS Levels over a one-year course of study. You would take the Extended Diploma (720) if you want to specialise, to develop most of the skills and knowledge required by employers in the animal care and management industries. The Extended Diploma (720) is likely to be taken as part of a full-time two year programme of study, or alongside other

	qualifications such as AS or A Levels over a longer period of time. You would take the Extended Diploma (1080) if you want to specialise and develop the skills and knowledge required by employers in the animal care and management industries. The Extended Diploma (1080) is likely to be taken as a full-time programme of study over two years. By taking this large qualification, you will be exposed to, and have the opportunity to gain experience in, the wider animal care and management sector. This will enable you to progress to a diverse range of employment opportunities, as you will have gained hands-on experience over 2 years, which employers really value.
Will the qualification lead to further learning?	You may wish to progress onto an Advanced Apprenticeship in Animal Management, which allows you to combine working in a kennel or cattery, pet store, welfare centre or in a similar business, and typically attending one day a week at college or with a training provider. You may wish to progress onto further learning within a Higher Education Institution. You could study courses such as: • Animal Management Foundation Degree • BSc (Hons) in Animal Science • BSc (Hons) in Animal Management • BSc (Hons) in Animal Management with Wildlife Conservation

Qualification structure

For the **City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (Zoos)** the teaching programme must cover the content detailed in the structure below:

Unit number	Unit title	GLH
Mandatory		
301	Principles of Health and Safety	30
302	Undertake and Review Work Related Experience in the Land-based Industries	30
303	Animal Health and Husbandry	60
304	Animal Feeding and Nutrition	60
305	Animal Behaviour and Communication	60
306	Biological Systems of Animals	60
307	Animal Welfare and Breeding	60
310	Exotic Animal Health and Husbandry	60
313	Aquatics Welfare and Breed Development	60
314	Avian Health and Husbandry	60
316	Zoological Collections	60
364	Business Management in the Land-Based Sector	60
362	Undertake Estate Skills	60
365	Customer Care and Retail Merchandising	60
367	Undertake a Specialist Project in the Land-based Sector	60
Optional – Learners must be taught at least 240 GLH from units 308, 309, 312, 315, 317, 319, 324, 326, 328, 329, 333 – 336, 366.		
308	Wildlife and Ecology Conservation	60
309	Wildlife Management and Rehabilitation	60
312	Animal Training	60
315	Animal Nursing	60
317	Farm Livestock Husbandry and Welfare	60
319	Inheritance and Genetics	60
324	Science Investigation and Report Writing	60
326	Small Animal Rehabilitation	60
328	Ecological Concepts and Application	60
329	Population Surveys, Ecology and Conservation	60

333	Managing Volunteers	60
334	Fish Biology	60
335	Environmental Interpretation in the Land-based Sector	60
336	Saltwater Captive Environments	60
366	Exploring Improvements, Opportunities for Diversification and New Business Initiatives within the Land Based Sector	60

For the **City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (Wildlife)** the teaching programme must cover the content detailed in the structure below:

Unit number	**Unit title**	**GLH**
Mandatory		
301	Principles of Health and Safety	30
302	Undertake and Review Work Related Experience in the Land-based Industries	30
303	Animal Health and Husbandry	60
304	Animal Feeding and Nutrition	60
305	Animal Behaviour and Communication	60
306	Biological Systems of Animals	60
307	Animal Welfare and Breeding	60
308	Wildlife and Ecology Conservation	60
309	Wildlife Management and Rehabilitation	60
317	Farm Livestock Husbandry and Welfare	60
328	Ecological Concepts and Application	60
329	Population Surveys, Ecology and Conservation	60
362	Undertake Estate Skills	60
364	Business Management in the Land-Based Sector	60
367	Undertake a Specialist Project in the Land-based Sector	60
Optional – Learners must be taught at least 240 GLH from units 310, 313 – 316, 326, 330 – 333, 335, 365.		
310	Exotic Animal Health and Husbandry	60
313	Aquatics Welfare and Breed Development	60
314	Avian Health and Husbandry	60
315	Animal Nursing	60
316	Zoological Collections	60

326	Small Animal Rehabilitation	60
330	Pest and Predator Control	60
331	Woodland Habitat Management	60
332	Heathland Habitat Management	60
333	Managing Volunteers	60
335	Environmental Interpretation in the Land-based Sector	60
365	Customer Care and Retail Merchandising	60
366	Exploring Improvements, Opportunities for Diversification and New Business Initiatives within the Land Based Sector	60

For the **City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (Animal Management)** the teaching programme must cover the content detailed in the structure below:

Unit number	Unit title	GLH
Mandatory		
301	Principles of Health and Safety	30
302	Undertake and Review Work Related Experience in the Land-based Industries	30
303	Animal Health and Husbandry	60
304	Animal Feeding and Nutrition	60
305	Animal Behaviour and Communication	60
306	Biological Systems of Animals	60
307	Animal Welfare and Breeding	60
308	Wildlife and Ecology Conservation	60
311	Pet Store Design and Management	60
315	Animal Nursing	60
325	Pet Allied Services	60
327	Kennel and Cattery Management	60
362	Undertake Estate Skills	60
364	Business Management in the Land-Based Sector	60
367	Undertake a Specialist Project in the Land-based Sector	60
Optional – Learners must be taught at least 240 GLH from units 309, 310, 312 – 314, 316, 317, 323, 326, 328, 365, 367.		
309	Wildlife Management and Rehabilitation	60
310	Exotic Animal Health and Husbandry	60

312	Animal Training	60
313	Aquatics Welfare and Breed Development	60
314	Avian Health and Husbandry	60
316	Zoological Collections	60
317	Farm Livestock Husbandry and Welfare	60
323	Dog Grooming	60
326	Small Animal Rehabilitation	60
328	Ecological Concepts and Application	60
365	Customer Care and Retail Merchandising	60
366	Exploring Improvements, Opportunities for Diversification and New Business Initiatives within the Land Based Sector	60

For the **City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (Science)** the teaching programme must cover the content detailed in the structure below:

Unit number	Unit title	GLH
Mandatory		
301	Principles of Health and Safety	30
302	Undertake and Review Work Related Experience in the Land-based Industries	30
303	Animal Health and Husbandry	60
304	Animal Feeding and Nutrition	60
305	Animal Behaviour and Communication	60
306	Biological Systems of Animals	60
307	Animal Welfare and Breeding	60
315	Animal Nursing	60
318	Fundamentals of Science	60
320	Chemistry for Biological Technicians	60
321	Cell Biology and Genetics	60
322	Biochemistry and Microbiology	60
324	Science Investigation and Report Writing	60
364	Business Management in the Land-Based Sector	60
367	Undertake Investigative Project in the Land-based Sector	60
Optional – Learners must be taught at least 240 GLH from units 308 – 310, 312 – 314, 316, 317, 326, 334, 335, 362.		
308	Wildlife and Ecology Conservation	60
309	Wildlife Management and Rehabilitation	60
310	Exotic Animal Health and Husbandry	60
312	Animal Training	60
313	Aquatics Welfare and Breed Development	60
314	Avian Health and Husbandry	60
316	Zoological Collections	60
317	Farm Livestock Husbandry and Welfare	60
319	Inheritance and Genetics	60
326	Small Animal Rehabilitation	60
334	Fish Biology	60
335	Environmental Interpretation in the Land-Based Sector	60
362	Undertake Estate Skills	60

Total qualification time (TQT)

Total Qualification Time (TQT) is the total amount of time, in hours, expected to be spent by a Learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study and assessment.

Title and level	GLH	TQT
City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management	1080	1800

Assessment requirements and employer involvement

To achieve the **City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (Zoos)** candidates must successfully complete all the mandatory assessment components, which cover the mandatory content of the qualification, **as well as** the optional assessment components for their chosen optional units

Component number	Title
Mandatory	
030	Level 3 Animal Management - Synoptic assignment (1)
031 or 531	Level 3 Animal Management - Theory exam (1)
038	Level 3 Animal Management - Synoptic assignment (2)
039 or 539	Level 3 Animal Management - Theory exam (2)
300	Level 3 Principles of health and safety - Theory exam (evolve online)
302	Level 3 Undertake and review work related experience in the land-based industries - Portfolio
306	Level 3 Biological systems of animals – Theory exam
367	Level 3 Undertake specialist project in the land-based sector – Assignment
Optional	
308	Level 3 Wildlife ecology and conservation - Assignment
309	Level 3 Wildlife management and rehabilitation - Assignment
312	Level 3 Animal Training – Assignment
315	Level 3 Animal Nursing –Assignment
317	Level 3 Farm livestock husbandry and welfare - Assignment
319	Level 3 Inheritance and genetics - Assignment
324	Level 3 Science investigation and report writing - Assignment
326	Level 3 Small animal rehabilitation - Assignment
328	Level 3 Ecological concepts and application - Assignment
329	Level 3 Population surveys, ecology and conservation - Assignment
333	Level 3 Managing Volunteers – Assignment
334	Level 3 Fish biology - Assignment
335	Level 3 Environmental Interpretation in the Land-based Sector – Assignment
365	Level 3 Customer Care and Retail Merchandising – Assignment
366	Level 3 Exploring improvements, opportunities for diversification and new business initiatives within the Land Based sector - Assignment

To achieve the **City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (Wildlife)** candidates must successfully complete **all** the mandatory assessment components **as well as** the optional assessment components for their chosen optional units.

Component number	Title
Mandatory	
030	Level 3 Animal Management - Synoptic assignment (1)
031 or 531	Level 3 Animal Management - Theory exam (1)
040	Level 3 Animal Management - Synoptic assignment (2)
041 or 541	Level 3 Animal Management - Theory exam (2)
300	Level 3 Principles of health and safety - Theory exam (evolve online)
302	Level 3 Undertake and review work related experience in the land-based industries - Portfolio
306	Level 3 Biological systems of animals – Theory exam
367	Level 3 Undertake specialist project in the land-based sector – Assignment
Optional	
310	Level 3 Exotic animal health and husbandry - Assignment
313	Level 3 Aquatics welfare and breed development - Assignment
314	Level 3 Avian health and husbandry - Assignment
315	Level 3 Animal Nursing –Assignment
316	Level 3 Zoological collections - Assignment
326	Level 3 Small animal rehabilitation - Assignment
330	Level 3 Pest and Predator Control – Assignment
331	Level 3 Woodland Habitat Management – Assignment
332	Level 3 Heathland Habitat Management – Assignment
333	Level 3 Managing Volunteers – Assignment
335	Level 3 Environmental Interpretation in the Land-based Sector – Assignment
365	Level 3 Customer Care and Retail Merchandising – Assignment
366	Level 3 Exploring improvements, opportunities for diversification and new business initiatives within the Land Based sector - Assignment

To achieve the **City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (Animal Management)** candidates must successfully complete **all** the mandatory assessment components **as well as** the optional assessment components for their chosen optional units

Component number	Title
Mandatory	
030	Level 3 Animal Management - Synoptic assignment (1)
031 or 531	Level 3 Animal Management - Theory exam (1)
042	Level 3 Animal Management - Synoptic assignment (2)
043 or 543	Level 3 Animal Management - Theory exam (2)
300	Level 3 Principles of health and safety - Theory exam (evolve online)
302	Level 3 Undertake and review work related experience in the land-based industries - Portfolio
306	Level 3 Biological systems of animals – Theory exam
367	Level 3 Undertake specialist project in the land-based sector – Assignment
Optional	
309	Level 3 Wildlife management and rehabilitation - Assignment
310	Level 3 Exotic animal health and husbandry - Assignment
312	Level 3 Animal training - Assignment
313	Level 3 Aquatics welfare and breed development - Assignment
314	Level 3 Avian health and husbandry - Assignment
316	Level 3 Zoological collections - Assignment
317	Level 3 Farm livestock husbandry and welfare - Assignment
323	Level 3 Dog grooming - Assignment
326	Level 3 Small animal rehabilitation - Assignment
328	Level 3 Ecological concepts and application - Assignment
365	Level 3 Customer Care and Retail Merchandising – Assignment
366	Level 3 Exploring improvements, opportunities for diversification and new business initiatives within the Land Based sector - Assignment

To achieve the **Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (Science)** candidates must successfully complete **all** the mandatory assessment components **as well as** the optional assessment components for their chosen optional units

Component number	Title
Mandatory	
030	Level 3 Animal Management - Synoptic assignment (1)
031 or 531	Level 3 Animal Management - Theory exam (1)
044	Level 3 Animal Management - Synoptic assignment (2)
045 or 545	Level 3 Animal Management – Theory exam (2)
300	Level 3 Principles of health and safety - Theory exam (evolve online)
302	Level 3 Undertake and review work related experience in the land-based industries - Portfolio
306	Level 3 Biological systems of animals – Theory exam
367	Level 3 Undertake specialist project in the land-based sector – Assignment
Optional	
308	Level 3 Wildlife ecology and conservation - Assignment
309	Level 3 Wildlife management and rehabilitation - Assignment
310	Level 3 Exotic animal health and husbandry - Assignment
312	Level 3 Animal training - Assignment
313	Level 3 Aquatics welfare and breed development - Assignment
314	Level 3 Avian health and husbandry - Assignment
316	Level 3 Zoological collections - Assignment
317	Level 3 Farm livestock husbandry and welfare - Assignment
319	Level 3 Inheritance and genetics - Assignment
326	Level 3 Small animal rehabilitation - Assignment
334	Level 3 Fish biology - Assignment
335	Level 3 Environmental interpretation in Land based - Assignment
362	Level 3 Undertake estate skills - Assignment

In addition, candidates **must** complete the mandatory employer involvement requirement for this qualification **before** they can be awarded a qualification grade. For more information, please see guidance in Section 4: Employer involvement.

Employer involvement	
Component number	**Title**
Mandatory	
833	Employer involvement

2 Centre requirements

Approval

New centres will need to gain centre approval. Existing centres who wish to offer this qualification must go through City & Guilds' **full** Qualification Approval Process. There is no fast track approval for this qualification. Please refer to the City & Guilds website for further information on the approval process: **www.cityandguilds.com**

Resource requirements

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

Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following requirements:

- be technically competent in the areas in which they are delivering
- be able to deliver across the breadth and depth of the content of the qualification being taught
- have recent relevant teaching and assessment experience in the specific area they will be teaching, or be working towards this
- demonstrate continuing CPD.

Physical resources

Centres must be able to demonstrate that they have access to the equipment and technical resources required to deliver this qualification and its assessments.

Centres must have access to a range of animal species and have sufficient animals so that animal welfare standards are kept. Assessment of technical skills will be carried out against **both** small and large animals.

Internal Quality Assurance

Internal quality assurance is key to ensuring accuracy and consistency of tutors and markers. Internal Quality Assurers (IQAs) monitor the work of all tutors involved with a qualification to ensure they are applying standards consistently throughout assessment activities. IQAs must have, and maintain, an appropriate level of technical competence and be qualified to make both marking and quality assurance decisions through a teaching qualification or recent, relevant experience.

Learner entry requirements

Centres must ensure that all learners have the opportunity to gain the qualification through appropriate study and training, and that any prerequisites stated in the *What is this qualification about?* section are met when registering on this qualification.

Age restrictions

This qualifications is approved for learners aged 16 – 19, 19+.

3 Delivering technical qualifications

Initial assessment and induction

An initial assessment of each learner should be made before the start of their programme to identify:

- if the learner has any specific learning or training needs,
- support and guidance they may need when working towards their qualification,
- the appropriate type and level of qualification.

We recommend that centres provide an introduction so that learners fully understand the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

Employer involvement

Employer involvement is essential to maximise the value of each learner's experience. Centres are required to involve employers in the delivery of technical qualifications at Key Stage 5 and/or their assessment, for every learner. This must be in place or planned before delivery programmes begin in order to gain qualification approval. See *Section 4: Employer involvement* for more detail.

Support materials

The following resources are available for this qualification:

Description	How to access
Sample assessments	Available on the qualification pages on the City & Guilds Website: www.cityandguilds.com
Technical Qualifications: Guide to Teaching, Learning and Assessment	Available on the City and Guilds website: 14-19-teaching-learning-assessment-guide-pdf.ashx (cityandguilds.com)
Quality Assurance Guide for Centres: Technical Qualifications and the Extended Project Qualification (EPQ)	Available on the City and Guilds website: technicals-quality-assurance-guide-for-centres-pdf.ashx (cityandguilds.com)

4 Employer involvement

Employer involvement is a formal component of Key Stage 5 Technical qualifications. It does not contribute to the overall qualification grading, but is a mandatory requirement that all learners must meet. As such it is subject to external quality assurance by City & Guilds.

Department for Education (DfE) requirements state:

Employer involvement in the delivery and/or assessment of technical qualifications provides a clear 'line of sight' to work, enriches learning, raises the credibility of the qualification in the eyes of employers, parents and students and furthers collaboration between the learning and skills sector and industry. [Technical qualifications] must:

- require all students to undertake meaningful activity involving employers during their study; and
- be governed by quality assurance procedures run by the awarding organisation to confirm that education providers have secured employer involvement for every student.

Extract from*:* Vocational qualifications for 16 to 19 year olds, 2017 and 2018 performance tables: technical guidance for awarding organisations, paragraphs 89-90.

City & Guilds will provide support, guidance and quality assurance of employer involvement.

Qualification approval

To be approved to offer City & Guilds technicals, centres must provide an Employer Involvement planner and tracker showing how every learner will be able to experience meaningful employer involvement, and from where sufficient and suitable employer representatives are expected to be sourced.

Centres must include in their planner a sufficient range of activities throughout the learning programme that provide a range of employer interactions for learners. Centres must also plan contingencies for learners who may be absent for employer involvement activities, so that they are not disadvantaged.

As part of the approval process, City & Guilds will review this planner and tracker. Centres which cannot show sufficient commitment from employers and/or a credible planner and tracker will be given an action for improvement with a realistic timescale for completion. **Approval will not be given** if employer involvement cannot be assured either at the start of the qualification, or through an appropriate plan of action to address this requirement before the learner is certificated.

Monitoring and reporting learner engagement

Employer involvement is a formal component of this qualification and is subject to quality assurance monitoring. Centres must record evidence that demonstrates that each learner has been involved in meaningful employer based activities against the mandatory content before claiming the employer involvement component for learners.

Centres must record the range and type of employer involvement each learner has experienced and submit confirmation that all learners have met the requirements to City & Guilds. If a centre cannot provide evidence that learners have met the requirements to achieve the component, then the learner will not be able to achieve the overall Technical Qualification.

Types of involvement

Centres should note that to be eligible, employer involvement activities **must** relate to one or more elements of the mandatory content of this qualification. This does not mean that employer involvement in the optional units is not valuable, and centres are encouraged to consider this wherever appropriate.

As the aim of employer involvement is to enrich learning and to give learners a taste of the expectations of employers in the industry area they are studying, centres are encouraged to work creatively with local employers.

Employers can identify the areas of skills and knowledge in their particular industry that they would wish to see emphasised for learners who may apply to work with them in the future. Centres and employers can then establish the type of input, and which employer representative might be able to best support these aims.

To be of most benefit this must add to, rather than replace the centre's programme of learning. Some examples of meaningful employer involvement are listed below. Employer involvement not related to the mandatory element of the qualification, although valuable in other ways, does not count towards this element of the qualification.

The DfE has provided the following examples of what does and does not count as meaningful employer involvement, as follows[1,2]

The following activities meet the requirement for meaningful employer involvement:

- students undertake structured work-experience or work-placements that develop skills and knowledge relevant to the qualification[3];
- students undertake project(s), exercises(s) and/or assessments/examination(s) set with input from industry practitioner(s);
- students take one or more units delivered or co-delivered by an industry practitioner(s). This could take the form of master classes or guest lectures;
- industry practitioners operate as 'expert witnesses' that contribute to the assessment of a student's work or practice, operating within a specified assessment framework. This may be a specific project(s), exercise(s) or examination(s), or all assessments for a qualification.

In all cases participating industry practitioners and employers must be relevant to the industry sector or occupation/occupational group to which the qualification relates.

[1] As extracted from: Vocational qualifications for 16 to 19 year olds
2017 and 2018 performance tables: technical guidance for awarding organisations
[2] This list has been informed by a call for examples of good practice in employer involvement in the delivery and assessment of technical qualifications - Employer involvement in the delivery and assessment of vocational qualifications
[3] DfE work experience guidance

The following activities, whilst valuable, do not meet the requirement for meaningful employer involvement:

- employers' or industry practitioners' input to the initial design and content of a qualification;
- employers hosting visits, providing premises, facilities or equipment;
- employers or industry practitioners providing talks or contributing to delivery on employability, general careers advice, CV writing, interview training etc;
- student attendance at career fairs, events or other networking opportunities;
- simulated or provider-based working environments eg hairdressing salons, florists, restaurants, travel agents, small manufacturing units, car servicing facilities;
- employers providing students with job references.

Types of evidence

For each employer involvement activity, centres are required to provide evidence of which learners undertook it, e.g. a candidate attendance register. The types of additional evidence required to support a claim for this component will vary depending on the nature of the involvement. E.g. for a guest lecture it is expected that a synopsis of the lecture and register would be taken which each learner and the guest speaker will have signed; expert witnesses will be identified and will have signed the relevant assessment paperwork for each learner they have been involved in assessing; evidence of contribution from employers to the development of locally set or adapted assignments.

Quality assurance process

As the employer involvement component is a requirement for achieving the KS5 Technical qualifications, it is subject to external quality assurance by City & Guilds at the approval stage and when centres wish to claim certification for learners.

Evidence will be validated by City & Guilds before learners can achieve the employer involvement component. Where employer involvement is not judged to be sufficient, certificates cannot be claimed for learners.

Sufficiency of involvement for each learner

It is expected that the centre will plan a range of activities that provide sufficient opportunities for each learner to interact directly with a range of individuals employed in the related industry. Centres must also provide contingencies for learners who may be absent for part of their teaching, so they are not disadvantaged. Any absence that results in a learner missing arranged activities must be documented. Where learners are unable to undertake all employer involvement activities due to temporary illness, temporary injury or other indisposition, centres should contact City & Guilds for further guidance.

Live involvement

Learners will gain most benefit from direct interaction with employers and/or their staff; however the use of technology (e.g. the use of live webinars) is encouraged to maximise the range of interactions. Where learners are able to interact in real time with employers, including through the use of technology, this will be classed as 'live involvement'.

It is considered good practice to record learning activities, where possible, to allow learners to revisit their experience and to provide a contingency for absent learners. This is not classed as live involvement however, and any involvement of this type for a learner must be identified as contingency.

Timing

A learner who has not met the minimum requirements cannot be awarded the component, and will therefore not achieve the qualification. It is therefore important that centres give consideration to scheduling employer involvement activities, and that enough time is allotted throughout delivery and assessment of the qualification to ensure that requirements are fully met.

5 Assessment

Summary of assessment methods and conditions

Component numbers	Assessment method	Description and conditions
030/038/ 040/ 042/ 044	Synoptic assignments	The synoptic assignment are **externally set, internally marked and externally moderated.** The assignment requires candidates to identify and use effectively in an integrated way an appropriate selection of skills, techniques, concepts, theories, and knowledge from across the content area. Candidates will be judged against the assessment objectives. Assignments will be released to centres as per dates indicated in the Assessment and Examination timetable published on our website. Centres will be required to maintain the security of all live assessment materials. Assignments will be password protected and released to centres through a secure method. There will be one opportunity within each academic year to sit the assignment. Candidates who fail the assignment will have one re-sit opportunity. The re-sit opportunity will be in the next academic year, and will be the assignment set for that academic year once released to centres. If the re-sit is failed, the candidate will fail the qualification. Please note that for externally set assignments City & Guilds provides guidance and support to centres on the marking and moderation process.
031/ 531/ 039/ 539/ 041/ 541/ 043/ 543/ 045/ 545	Externally marked exams	The exams are **externally set and externally marked,** and will be taken online through City & Guilds' computer-based testing platform. The exam is designed to assess the candidate's depth and breadth of understanding across content in the qualification at the end of the period of learning, using a range of question types and will be sat under invigilated examination conditions. See JCQ requirements for details: **http://www.jcq.org.uk/exams-office/ice---instructions-for-conducting- examinations** The exam specification shows the coverage of the exam across the qualification content. Candidates who fail the exam at the first sitting will have a maximum of two opportunities to retake. If the candidate fails the exam three times then they will fail the qualification. (Note: the third and final retake opportunity applies to Level 3 only.) For exam dates, please refer to the Assessment and Examination timetable..

302	Portfolio of evidence	This unit will be evidenced by a portfolio of evidence.
300	Evolve online on-demand exam	This exam is **externally set and externally marked** and will be taken online through City & Guilds' computer-based testing platform under invigilated exam conditions. The exam is available on-demand and can be taken at any time in the year. There is no maximum number of retake attempts for this exam , however, learners should be given sufficient time and tutor support before resitting.
306	Internally marked theory exam	This theory assessment is **externally set, internally marked and externally verified.** It is designed to assess the candidate's depth and breadth of understanding from across the unit content area and will be sat under supervised conditions. This assessment is available on our website. The assessment can be taken at any point during the academic year, but evidence must be submitted on to the Moderation Portal by the deadline in Assessment and Examination timetable, published on our website. Centres will be required to maintain the security of all live assessment materials. Assessments will be password protected and released to centres through a secure method. There is no re-sit limit for this assessment. If a learner fails, they can re-sit a different version. Assessors should allow seven days before reassessment.
367	Unit assignments	The unit assignments are **externally set, internally marked and externally verified**. The assignment requires candidates to identify and use effectively skills, knowledge and understanding from across the unit content area. Candidates will be judged against the unit grading criteria These assessments are available on our website. These assessments can be taken at any point during the academic year, but evidence must be submitted on to the Moderation Portal by the deadline in Assessment and Examination timetable, published on our website. Centres will be required to maintain the security of all live assessment materials. Assessments will be password protected and released to centres through a secure method. There is no re-sit limit for these assessment. If a learner fails an assignment they can re-sit a different version. Assessors should allow seven days before resubmission or reassessment.

Optional units 308, 309, 310, 312, 313, 314, 315, 316, 317, 318, 319, 323, 324, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 362, 365, 366	Unit assignments	The unit assignments are **externally set, internally marked and externally verified.** The assignment requires candidates to identify and use effectively skills, knowledge and understanding from across the unit content area. Candidates will be judged against the unit grading criteria Arrangements for release, security and re-sitting assignments are the same as detailed for the synoptic assignment. Assignments are available on our website. The assignments can be taken at any point during the academic year, but evidence must be submitted on to the Moderation Portal by the deadline in Assessment and Examination timetable, published on our website. Centres will be required to maintain the security of all live assessment materials. Assignments will be password protected and released to centres through a secure method. There is no re-sit limit for these assignments. If a learner fails an assignment they can re-sit a different version. Assessors should allow seven days before resubmission or reassessment.

What is synoptic assessment?

Technical qualifications are based around the development of a toolkit of knowledge, understanding and skills that an individual needs in order to have the capability to work in a particular industry or occupational area. Individuals in all technical areas are expected to be able to apply their knowledge, understanding and skills in decision making to solve problems and achieve given outcomes independently and confidently.

City & Guilds technical qualifications require candidates to draw together their learning from across the qualification to solve problems or achieve specific outcomes by explicitly assessing this through the synoptic assignment component.

In this externally set, internally marked and externally moderated assessment the focus is on bringing together, selecting and applying learning from across the qualification rather than demonstrating achievement against units or subsets of the qualification content. The candidate will be given an appropriately levelled, substantial, occupationally relevant problem to solve or outcome to achieve. For example this might be in the form of a briefing from a client, leaving the candidate with the scope to select and carry out the processes required to achieve the client's wishes, as they would in the workplace.

Candidates will be marked against assessment objectives (AOs) such as their breadth and accuracy of knowledge, understanding of concepts, and the quality of their technical skills as well as their ability to use what they have learned in an integrated way to achieve a considered and high quality outcome.

How the assignment is synoptic for this qualification

The typical assignment brief could be to consider, via case studies and research, the specific needs of animals within a specific environment or business and assess how the animal's welfare can be met. This will require the candidate to draw together knowledge from across the qualification to assess and consider how health, husbandry and welfare needs vary and the importance of husbandry and environment. Candidates will also need to evaluate how the needs of business can also be met. They will need to communicate their findings and thoughts when completing reports. They will also have tasks specific to their chosen pathway.

External exam for stretch, challenge and integration

The externally set, externally marked exams (031/531 and 039/539 or 041/541 or 043/543 or 045/545) will draw from across the mandatory content of the qualification, using a range of shorter questions to confirm breadth of knowledge and understanding. Extended response questions are included, giving candidates the opportunity to demonstrate higher level understanding and integration through discussion, analysis and evaluation, and ensuring the assessment can differentiate between 'just able' and higher achieving candidates.

Optional unit assessments and integration into the synoptic qualification content

While the mandatory units for this qualification provide the main skills and knowledge required to work in animal management the optional units provided give centres flexibility when devising programmes to meet local employment needs, where the purpose of the qualification demands this. The assessments for the optional units will require that the candidate has experienced the full breadth of mandatory learning of the qualification in order to better demonstrate the rounded performance expected at higher grades.
Optional unit assessments are externally set, internally marked and externally verified.

Assessment objectives

The assessments for this qualification are set against a set of assessment objectives (AOs) which are used across all City & Guilds Technicals to promote consistency among qualifications of a similar purpose. They are designed to allow judgement of the candidate to be made across a number of different categories of performance.

Each assessment for the qualification has been allocated a set number of marks against these AOs based on weightings recommended by stakeholders of the qualification. This mark allocation remains the same for all versions of the assessments, ensuring consistency across assessment versions and over time.

The following table explains all AOs in detail, including weightings for the synoptic assignments. In some cases, due to the nature of a qualification's content, it is not appropriate to award marks for some AOs. Where this is the case these have been marked as N/A. Weightings for exam (AOs 1, 2 and 4 only) can be found with the exam specification.

Assessment objective	City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) (component 030, year 1) Typical expected evidence of knowledge, understanding and skills	Approximate weighting
AO1 Recalls knowledge from across the breadth of the qualification.	Relevant legislation, signs of health, diseases and disorders, animal accommodation, risk assessments, husbandry and breeding.	20%
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Animal pathogens and preventative treatments, animal welfare, animal behaviour, nutrition and feeding requirements, breeding strategies.	25%
AO3 Demonstrates technical skills from across the breadth of the qualification.	Calculating animal feed rations, animal handling, accommodation maintenance, health checks, and husbandry skills.	25%
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	Bringing together all knowledge and research, evaluation of management plans, links to animal welfare.	20%
AO5 Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.	Justification and suggestions of areas for improvements, links between husbandry, welfare needs and behaviour, reports.	10%

Assessment objective	City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) Level 3 Advanced Technical Extended Diploma in Animal Management (Zoos) (1080) (component 038, year 2) Typical expected evidence of knowledge, understanding and skills	Approximate weighting
AO1 Recalls knowledge from across the breadth of the qualification.	Ethical sourcing and responsible ownership of animals, legislation and codes of practice, animal health and disease control, animal welfare and stereotypic behaviours, reproductive requirements, nutritional requirements, accommodation requirements and design, handling and restraint techniques, transporting animals, aquatic systems, anatomies of different species, role of modern zoos and ethics, principles of enrichment, range and scope of relevant industries, business structures and resources, promotions and marketing.	20%
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Legislation and codes of practice, animal health signs and symptoms, nutritional requirements and diets, animal behaviour, animal accommodation, animal welfare, handling and restraint, animal transportation, customer service, importance of relevant businesses and the marketplace.	20%
AO3 Demonstrates technical skills from across the breadth of the qualification.	Animal husbandry, accommodation design, set up and maintenance, safe working practices, feeding methods, handling and restraint techniques, transporting animals, water testing and maintenance of aquatic systems, routine health checks, updating record systems, implementation of enrichment, constructing, repairing and maintaining boundaries, structures and surfaces, habitat management and customer service skills.	30%
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	Knowledge and understanding applied to specific situations, justification of decisions, reflection and evaluation and problem solving skills.	20%
AO5 Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.	Justification and suggestions of areas for improvements, links between husbandry, welfare needs and behaviour, checking quality of work for accuracy, review of progress and self-evaluation.	10%

Assessment objective	City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) Level 3 Advanced Technical Extended Diploma in Animal Management (Wildlife) (1080) (component 040, year 2) Typical expected evidence of knowledge, understanding and skills	Approximate weighting
AO1 Recalls knowledge from across the breadth of the qualification.	Relevant legislation, signs of health, diseases and disorders, animal accommodation, risk assessments, husbandry and breeding, structure and functions of biological systems, national and international conservation strategies.	20%
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Animal pathogens and preventative treatments, animal welfare, animal behaviour, nutrition and feeding requirements, breeding strategies, production systems for farm livestock, accommodation requirements of farm livestock, animal biological systems, control mechanisms in animals, neural control in animals, animals senses and adaptations, national and international conservation strategies, population dynamics, business resources and structures, business market place and financial and physical record keeping systems.	20%
AO3 Demonstrates technical skills from across the breadth of the qualification.	Calculating animal feed rations, animal handling, accommodation maintenance, health checks, husbandry skills, health and safety, construct, repair or maintain boundaries, structures or surfaces, practical habitat management and wildlife population field studies.	30%
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	Knowledge and understanding applied to specific situations, justification of decisions, reflection and evaluation of management plans, links to animal welfare and problem solving skills.	20%
AO5 Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.	Justification and suggestions of areas for improvements, links between husbandry, welfare needs and behaviour, checking quality of work for accuracy, review of progress and self-evaluation.	10%

Assessment objective	City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) Level 3 Advanced Technical Extended Diploma in Animal Management (Animal Management)(1080) (component 042, year 2) Typical expected evidence of knowledge, understanding and skills	Approximate weighting
AO1 Recalls knowledge from across the breadth of the qualification.	Veterinary procedures and equipment, common medical conditions, medication, disease management, sourcing livestock, breed characteristics, behaviour observations, roles and responsibilities of staff, career pathways, legislation and codes of practice.	20%
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Global ecosystems, conservation strategies, population dynamics, pet store design, pet shop licences, relevant legislation, sourcing livestock and non-livestock products, husbandry requirements, marketing, customer service skills, veterinary terminology, common medical and surgical conditions, veterinary practice procedures, designs and facilities of kennels and catteries, dealing with emergencies, business resources and structures, business marketplace, financial and physical record keeping systems.	20%
AO3 Demonstrates technical skills from across the breadth of the qualification.	Caring for in-patients, risk assessments, handling and restraint techniques, animal husbandry, animal management techniques, behavioural assessments, policies and procedures, animal admission and settling in procedures, customer service skills, construct, repair or maintain boundaries, structures or surfaces, ecological habitat surveys and habitat management.	30%
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	Applying knowledge and understanding, justifying decisions, linking context to animal welfare, considering contingencies, reflection and evaluation.	20%
AO5 Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.	Planning, justification and suggestions of areas for improvements, contingencies considered and implemented, links between husbandry, animal welfare needs and behaviour, equipment checks and safe storage.	10%

Assessment objective	City & Guilds Level 3 Advanced Technical Extended Diploma in Animal Management (1080) Level 3 Advanced Technical Extended Diploma in Animal Management (Science) (1080) (component 044, year 2) Typical expected evidence of knowledge, understanding and skills	Approximate weighting
AO1 Recalls knowledge from across the breadth of the qualification.	Relevant legislation, signs of health, diseases and disorders, in-patient accommodation, veterinary equipment, radiography, risk assessments, health and husbandry, energy transfer, acids and bases, structure and functions of biological systems.	20%
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Animal pathogens and preventative treatments, animal welfare, animal behaviour, nutrition and feeding requirements, breeding strategies, animal biological systems, buffering in biological systems, organic compounds, functions of organelles, DNA, growth and reproduction of bacteria, enzyme kinetics, control mechanisms in animals, neural control in animals, animals senses and adaptations, veterinary terminology and common conditions, infectious diseases, roles of veterinary staff, legislation and codes of practice, hazards and controls, rates of reaction, calorific value of food and fuel, plan investigations, periodic table, microscopy, business resources and structures, business marketplace, financial and physical record keeping systems.	20%
AO3 Demonstrates technical skills from across the breadth of the qualification.	Animal husbandry, handling and restraint, accommodation maintenance, safe working practices, animal feeding, health checks, laboratory skills and techniques, investigation using scientific principles, principles of good experimental design, isolate and classify bacteria, collect, collate and analyse results from investigation.	30%
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes	Bringing together all knowledge and research, reflection and evaluation of management plans, draw conclusions from investigation, communicate scientific information, report on scientific investigation, justification of decisions and links to animal welfare	20%
AO5 Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.	Thorough planning, justification and suggestions of areas for improvements, contingencies considered and implemented, links between husbandry, animal welfare needs and behaviour, equipment checks and safe storage.	10%

Exam specifications

AO weightings per exam

AO	Exam 031 or 531 weighting (approx. %)	Exam 039 or 539 weighting (approx. %)	Exam 041 or 541 weighting (approx. %)	Exam 043 or 543 weighting (approx. %)	300 exam weighting (approx. %)	Exam 306 weighting (approx. %)
AO1 Recalls knowledge from across the breadth of the qualification.	25	23	23	23	70	30
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	55	57	57	57	30	70
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	20	20	20	20	N/A	N/A

The way the exam covers the content of the qualification is laid out in the table below:

Assessment type: Examiner marked, written exam, delivered online or paper based *
Assessment conditions: Invigilated examination conditions
Grading: X/P/M/D

Synoptic written exam 031/531	**Duration: 2 hours**		
Unit	**Unit title**	**Number of marks**	**%**
303 Animal Health and Husbandry	LO1 Recognise indicators of health in animals LO2 Understand common disease and disorders, their treatment and prevention LO4 Recognise how to deliver and record basic animal treatments	17	28
304 Animal Feeding and Nutrition	LO1 Understand the basics of nutrition LO2 Understand nutritional values and properties of different food types LO3 Understand the feeding requirements of animals at different life stages LO4 Plan, monitor, record and evaluate diets and feeding regiments for animals	16	27
305 Animal Behaviour and Communication	LO1 Understand behaviour patterns in animals LO3 Understand the factors influencing behaviour LO4 Understand social behaviour and animal communication	15	25
N/A	Integration across the units	12	20
	Total	**60**	**100**

Assessment type: Examiner marked, written exam, delivered online or paper based *
Assessment conditions: Invigilated examination conditions
Grading:X/P/M/D

Synoptic written exam 039/539	Duration: 2 hours		
Unit	**Unit title**	**Number of marks**	**%**
313 Aquatic Welfare and Breed Development	LO1.Understand how to develop and maintain aquatic systems LO2.Understand commonly kept fish species and aspects of their biology LO3.Analyse foods and feeding techniques for aquatic species LO4.Understand common fish diseases and causes of ill health LO5.Explore different aquatic systems and establishments and the ethics surrounding sourcing livestock	14	23
314 Avian Health and Husbandry	LO1.Evaluating existing methods of husbandry for avian species LO2.Understand the health and welfare requirements of avian species LO4.Understand avian anatomy and reproductive physiology	15	25
316 Zoological Collections	LO1.Understand the role of the modern zoo LO2.Understand the techniques used to improve the lives of zoo animals LO3.Understand the systems for effective zoo operation LO4.Understand the requirements of zoo animal husbandry	13	22
364 Business Management in the Land-Based Sector	LO1 Understand the breadth and importance of an industry in the environmental and land- based sector LO2.Understand business resources and structures LO3.Understand the business marketplace LO4.Understand how to use financial and physical record keeping systems	6	10
N/A	Integration across the units	12	20
	Total	**60**	**100**

Assessment type: Examiner marked, written exam, delivered online or paper based *
Assessment conditions: Invigilated examination conditions
Grading:X/P/M/D

Synoptic written exam 041/541	Duration: 2 hours		
Unit	**Unit title**	**Number of marks**	**%**
308 Wildlife Ecology and Conservation	LO1.Understand changes in global ecosystems LO2.Understand national and international conservation strategies for wildlife and their habitats LO3.Understand population dynamic	13	22
309 Wildlife Management and Rehabilitation	LO1.Conduct a field study of wildlife populations LO2. Understand how to rehabilitate wildlife LO3 Understand wildlife and human interaction LO4.Understand how to manage wild animal population	16	26
328 Ecological Concepts and Application	LO1.Understand the principles of behavioural ecology for life history strategies LO2.Understand the principles of population dynamics and metapopulation theory LO3.Plan and carry out ecological surveys for flora LO4.Plan and carry out ecological surveys for fauna	13	22
364 Business Management in the Land-Based Sector	LO1 Understand the breadth and importance of an industry in the environmental and land- based sector LO2.Understand business resources and structures LO3.Understand the business marketplace LO4.Understand how to use financial and physical record keeping systems	6	10
N/A	Integration across the units	12	20
	Total	**60**	**100**

Assessment type: Examiner marked, written exam, delivered online or paper based *
Assessment conditions: Invigilated examination conditions
Grading: X/P/M/D

Synoptic written exam 043/543	Duration: 2 hours		
Unit	**Unit title**	**Number of marks**	**%**
308 Wildlife Ecology and Conservation	LO1.Understand changes in global ecosystems LO2.Understand national and international conservation strategies for wildlife and their habitats LO3.Understand population dynamic	14	23
315 Animal Nursing	LO1.Understand veterinary terminology and common conditions LO2.Understand veterinary practice procedures	11	19
327 Kennel and Cattery Management	LO1.Understand different designs and facilities of kennels and catteries LO2.Admit animals to a kennel and cattery and follow administrative procedures LO3.Carry out animal husbandry and specialist animal management techniques in a kennel and cattery	14	23
364 Business Management in the Land-Based Sector	LO1 Understand the breadth and importance of an industry in the environmental and land- based sector LO2.Understand business resources and structures LO3.Understand the business marketplace LO4.Understand how to use financial and physical record keeping systems	9	15
N/A	Integration across the units	12	20
	Total	**60**	**100**

Assessment type: Examiner marked, written exam, delivered online or paper based *
Assessment conditions: Invigilated examination conditions
Grading: X/P/M/D

Synoptic written exam 045/545	Duration: 2 hours		
Unit	**Unit title**	**Number of marks**	**%**
315 Animal Nursing	LO1.Understand veterinary terminology and common conditions LO2.Understand veterinary practice procedures	14	23
318 Fundamentals of Science	LO1.Measure quantities for chemical reactions LO2.Interpret the key features of equilibrium processes using the principles of good experimental design	12	20
321 Cell Biology and Genetics	LO1.Understand the structure and function of biological cells LO2.Understand the structure, function and replication of DNA LO3.Understand the principles of Medellin inheritance for predicting inheritance LO4.Understand the structure and function of tissues	22	37
N/A	Integration across the units	12	20
	Total	**60**	**100**

Assessment type: Multiple-choice exam, delivered online *
Assessment conditions: Invigilated examination conditions
Grading: X/P

Level 3 Principles of health and safety - Theory exam (300)	**Duration: 1 hour**		
Unit	**Learning outcome**	**Number of marks**	**%**
Level 3 Principles of health and safety (301)	1. Understand health and safety legislation	9	30
	2. Understand the risk assessment process	8	26
	3. Understand first aid requirements	7	23
	4. Understand safe manual handling principles	2	6
	5. Understand the use of fire extinguishers	4	15
	Total	**30**	**100**

*These exams are sat under invigilated examination conditions, as defined by the JCQ: **http://www.jcq.org.uk/exams-office/ic**e---instructions-for-conducting-examinations**.**

*Entry for exams can be made through the City & Guilds Walled Garden.

6 Moderation and standardisation of assessment

City & Guilds' externally set synoptic assignments for technical qualifications are designed to draw from across the qualifications' content, and to contribute a significant proportion towards the learner's final qualification grade. They are subject to a rigorous external quality assurance process known as external moderation.

Moderation is the process where external quality assurers are standardised to a national standard in order to review centre marking of internally marked assessments. These external quality assurers are referred to as 'moderators'. Moderators will review a representative sample of 'candidate work' across the mark range from every centre. Their marks act as a benchmark to inform City & Guilds whether centre marking is in line with City & Guilds' standard.

Where moderation shows that the centre is applying the marking criteria within a reasonable range of mark tolerance, centre marks for the whole cohort will be accepted. Where moderation shows that the centre is either consistently too lenient or consistently too harsh in comparison to the national standard, an appropriate adjustment (up or down) will be made to the marks of the whole cohort, retaining the centre's rank ordering. Due to the nature of the assessment and the marking grid across Assessment Objectives (AOs), it is not expected that the tutors mark and the moderators mark will match exactly.

Where centre application of the marking criteria is inconsistent, an appropriate adjustment for the whole cohort may not be possible on the basis of the sample of candidate work. In these instances a complete remark of the candidate work may be necessary.

Additional unit and optional unit assessments are also subject to external quality assurance through a verification process. This involves external quality assurers scrutinising IQA records; sampling candidates' work across a range of units and also sampling across the mark/grade range. Centres are then provided with feedback and actions to ensure that results are valid and reliable.

For more detailed information, on the quality assurance process for synoptic assignments and additional unit and optional unit assessments please refer to 'Quality Assurance Guide for Centres: Technical Qualifications and the EPQ available to download on the City & Guilds website.

It is vital that centres familiarise themselves with this process, and how it impacts on their delivery plan within the academic year.

Supervision and authentication of internally assessed work

The Head of Centre is responsible for ensuring that internally assessed work is conducted in accordance with City & Guilds' requirements.
City & Guilds requires both tutors and candidates to sign declarations of authenticity. If the tutor is unable to sign the authentication statement for a particular candidate, then the candidate's work cannot be accepted for assessment.

Internal standardisation

For internally marked work the centre is required to conduct internal standardisation to ensure that all work at the centre has been marked and / or graded to the same standard. It is the Internal Quality Assurer's (IQA's) responsibility to ensure that standardisation has taken place, and that the training includes the use of reference and archive materials such as work from previous years as appropriate.

Internal appeal

Centres must have an internal process in place for candidates to appeal the marking of internally marked components, ie the synoptic assignment and any optional unit assignments. This must take place before the submission of marks or grades for external quality assurance. The internal process must include candidates being informed of the marks (or grades) the centre has given for internally assessed components, as they will need these to make the decision about whether or not to appeal.

Post-quality assurance procedures

Once the external quality assurance processes have been completed, feedback is provided to the centre on the standard of the internal assessment, highlighting areas of good practice, and potential areas for improvement. This will inform future centre assessment, and standardisation activities, as well as external quality assurance and risk management activity.

City & Guilds will then carry out awarding, the process by which grade boundaries are set with reference to the candidate evidence available on the platform.

Centres retaining evidence

Centres must retain assessment records for each candidate for a minimum of three years. To help prevent plagiarism or unfair advantage in future versions, candidate work may not be returned to candidates. Samples may however be retained by the centre as examples for future standardisation of marking.

7 Grading

Awarding individual assessments

Individual assessments will be graded, by City & Guilds, as pass/merit/distinction where relevant. The grade boundaries for pass and distinction for each assessment will be set through a process of professional judgement by technical experts. Merit will usually be set at the midpoint between pass and distinction. The grade descriptors for pass and distinction, and other relevant information (eg archived samples of candidate work and statistical evidence) will be used to determine the mark at which candidate performance in the assessment best aligns with the grade descriptor in the context of the qualification's purpose. Boundaries will be set for each version of each assessment to take into account relative difficulty.

Please note that as the merit grade will usually be set at the arithmetical midpoint between pass and distinction, there are no descriptors for the merit grade for the qualification overall.

Grade descriptors

To achieve a pass, a candidate will be able to

- Demonstrate the knowledge and understanding required to work in the occupational area, its principles, practices and legislation.
- Describe some of the main factors impacting on the occupation to show good understanding of how work tasks are shaped by the broader social, environmental and business environment it operates within.
- Use the technical industry specific terminology used in the industry accurately.
- Demonstrate the application of relevant theory and understanding to solve non-routine problems.
- Interpret a brief for complex work related tasks, identifying the key aspects, and showing a secure understanding of the application of concepts to specific work related tasks.
- Carry out planning which shows an ability to identify and analyse the relevant information in the brief and use knowledge and understanding from across the qualification (including complex technical information) to interpret what a fit for purpose outcome would be and develop a plausible plan to achieve it.
- Achieve an outcome which successfully meets the key requirements of the brief.
- Identify and reflect on the most obvious measures of success for the task and evaluate how successful they have been in meeting the intentions of the plan.
- Work safely throughout, independently carrying out tasks and procedures, and having some confidence in attempting the more complex tasks.

To achieve a distinction, a candidate will be able to

- Demonstrate the excellent knowledge and understanding required to work to a high level in the occupational area, its principles, practices and legislation.
- Analyse the impact of different factors on the occupation to show deep understanding of how work tasks are shaped by the broader social, environmental, and business environment it operates within.
- Demonstrate the application of relevant theory and understanding to provide efficient and effective solutions to complex and non-routine problems.
- Analyse the brief in detail, showing confident understanding of concepts and themes from across the qualification content, bringing these together to develop a clear and stretching plan, that would credibly achieve an outcome that is highly fit for purpose.

- Achieve an outcome which shows an attention to detail in its planning, development and completion, so that it completely meets or exceeds the expectations of the brief to a high standard.
- Carry out an evaluation in a systematic way, focussing on relevant quality points, identifying areas of development/ improvement as well as assessing the fitness for purpose of the outcome.

Awarding grades and reporting results

The overall qualification grade will be calculated based on aggregation of the candidate's achievement in each of the assessments for the mandatory units, taking into account the assessments' weighting. The qualification will be reported on a ten grade scale: Pass Pass Pass, Pass Pass Merit, Pass Merit Merit, Merit Merit Merit, Merit Merit Distinction, Merit Distinction Distinction, Distinction Distinction Distinction, Distinction Distinction Distinction*, Distinction Distinction* Distinction*, Distinction* Distinction* Distinction*.

All assessments **must** be achieved at a minimum of pass for the qualification to be awarded. Candidates who fail to reach the minimum standard for grade pass for an assessment(s) will not have a qualification grade awarded and will not receive a qualification certificate.

The approximate pass grade boundary for the synoptic assignment(s) in this qualification are:

Synoptic Assignment	Pass Mark (%)
Synoptic Assignment (030/ 038/ 040/ 042/ 044)	40

Please note that each synoptic assignment is subject to an awarding process before final grade boundaries are confirmed.

The health and safety assessment 301 must be passed to achieve the qualification. This assessment is graded pass/fail.

The contribution of assessments towards the overall qualification grade is as follows:

Assessment method	Grade scale	% contribution
Synoptic Assignment (030)	X/P/M/D	30%
Synoptic Assignment (038) or (040) or (042) or (044)	X/P/M/D	30%
Exam (039/ 539) or (041/ 541) or (043/ 543) or (045/ 545)	X/P/M/D	20%
Exam (031 or 531)	X/P/M/D	20%

Both synoptic assignments and exams are awarded (see 'Awarding individual assessments', at the start of Section 7, above), and candidates' grades converted to points. The minimum points available for each assessment grade is listed in the table below. The range of points between the pass, merit and distinction boundaries will be accessible to candidates. For example a candidate that achieves a middle to high pass in an assessment will receive between 8 and 10 points, a candidate that achieves a low to middle merit in an assessment will receive between 12 and 14 points. The points above the minimum for the grade for each assessment are calculated based on the candidate's score in that assessment.

Zoos/ Wildlife/ Animal Management/ Science Pathways:

	Pass	Merit	Distinction
Synoptic Assignment (030): 30%	6	12	18
Synoptic Assignment (038) or (040) or (042) or (044): 30%	6	12	18
Exam (039 or 539) or (041 or 541) or (043 or 543) or (045 or 545): 20%	6	12	18
Exam (031 or 531): 20%	6	12	18

The weighted average of candidate's points for each assessment is calculated, and the overall grade of the qualification will then be determined using the following criteria.

Qualification Grade	Minimum points
Distinction*, Distinction*, Distinction*	20.5
Distinction, Distinction*, Distinction*	19.3
Distinction, Distinction, Distinction*	18.2
Distinction, Distinction, Distinction	17
Merit, Distinction, Distinction	15
Merit, Merit, Distinction	13
Merit, Merit, Merit	11
Pass, Merit, Merit	9.3
Pass, Pass, Merit	7.7
Pass, Pass, Pass	6

Candidates achieving Distinction*, Distinction*, Distinction* will be the highest achieving of the Distinction candidates.

8 Administration

Approved centres must have effective quality assurance systems to ensure valid and reliable delivery and assessment of qualifications. Quality assurance includes initial centre registration by City & Guilds and the centre's own internal procedures for monitoring quality assurance procedures.

Consistent quality assurance requires City & Guilds and its associated centres to work together closely; our Quality Assurance Model encompasses both internal quality assurance (activities and processes undertaken within centres) and external quality assurance (activities and processes undertaken by City & Guilds).

For this qualification, standards and rigorous quality assurance are maintained by the use of:

- internal quality assurance
- City & Guilds external moderation (synoptic assessments)
- City & Guilds external verification (additional unit / optional assessments).

In order to carry out the quality assurance role, Internal Quality Assurers (IQAs) must have and maintain an appropriate level of technical competence and have recent relevant assessment experience. For more information on the requirements, refer to *Section 2: Centre requirements* in this handbook.

To meet the quality assurance criteria for this qualification, the centre must ensure that the following procedures are followed:

- suitable training of staff involved in the assessment of the qualification to ensure they understand the process of marking and standardisation
- completion by the person responsible for internal standardisation of the Centre Declaration Sheet to confirm that internal standardisation has taken place
- the completion by candidates and supervisors/tutors of the record form for each candidate's work.

External quality assurance

City & Guilds will undertake external moderation and verification activities to ensure that the quality assurance criteria for this qualification are being met. Centres must ensure that they co-operate with City & Guilds staff and representatives when undertaking these activities.

City & Guilds requires the Head of Centre to

- facilitate any inspection of the centre which is undertaken on behalf of City & Guilds
- make arrangements to receive, check and keep assessment material secure at all times,
- maintain the security of City & Guilds confidential material from receipt to the time when it is no longer confidential
- and keep completed assignment work and examination scripts secure from the time they are collected from the candidates to their dispatch to City & Guilds.

Enquiries about results

The services available for enquiries about results include a review of marking for exam results and review of moderation for synoptic assignments. Requests must be submitted within the specified period after the publication of results for individual assessments. Please see the City & Guilds website for more information.

Re-sits and shelf-life of assessment results

Re-sits and shelf-life of assessment results Candidates who have failed an exam or wish to re-take it in an attempt to improve their grade, can do so **twice**. The best result will count towards the final qualification. See guidance on individual assessment types in Section 5.

Factors affecting individual learners

If work is lost, City & Guilds should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form, JCQ/LCW, to inform City & Guilds Customer Services of the circumstances.

Learners who move from one centre to another during the course may require individual attention. Possible courses of action depend on the stage at which the move takes place. Centres should contact City & Guilds at the earliest possible stage for advice about appropriate arrangements in individual cases.

Malpractice

Please refer to the City & Guilds guidance notes Managing cases of suspected malpractice in examinations and assessments. This document sets out the procedures to be followed in identifying and reporting malpractice by candidates and/or centre staff and the actions which City & Guilds may subsequently take. The document includes examples of candidate and centre malpractice and explains the responsibilities of centre staff to report actual or suspected malpractice. Centres can access this document on the City & Guilds website.

Examples of candidate malpractice are detailed below (please note that this is not an exhaustive list):

- falsification of assessment evidence or results documentation
- plagiarism of any nature
- collusion with others
- copying from another candidate (including the use of ICT to aid copying), or allowing work to be copied
- deliberate destruction of another's work
- false declaration of authenticity in relation to assessments
- impersonation.

These actions constitute malpractice, for which a penalty (eg disqualification from the assessment) will be applied.

Where suspected malpractice is identified by a centre after the candidate has signed the declaration of authentication, the Head of Centre must submit full details of the case to City & Guilds at the earliest opportunity. Please refer to the form in the document Managing cases of suspected malpractice in examinations and assessments.

Access arrangements

Access arrangements are adjustments that allow candidates with disabilities, special educational needs and temporary injuries to access the assessment and demonstrate their skills and knowledge without changing the demands of the assessment. These arrangements must be made before assessment takes place.

It is the responsibility of the centre to ensure at the start of a programme of learning that candidates will be able to access the requirements of the qualification.

Please refer to the *JCQ access arrangements and reasonable adjustments and Access arrangements - when and how applications need to be made to City & Guilds* for more information. Both are available

on the City & Guilds website.

Special consideration

We can give special consideration to candidates who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given after the examination.

Applications for either access arrangements or special consideration should be submitted to City & Guilds by the Examinations Officer at the centre. For more information please consult the current version of the JCQ document, *A guide to the special consideration process*. This document is available on the City & Guilds website

Unit 301 Principles of Health and Safety

UAN:	A/507/4634
Level:	3
GLH:	30

What is this unit about?

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

Learners will be able to recognise common health and safety practices and processes which they will encounter within the workplace. The land-based sector has one of the worst fatal accident records of any major industrial sector and a lack of basic training and/or competency is often a contributory factor. There is a need for new entrants to these industries to gain essential health and safety knowledge in order to minimise harm to themselves and to improve attitudes and behaviour in the workplace. In addition, the learners have the opportunity to consider factors which are specific to their workplace.

This unit must be taught alongside **all** technical units within the qualification ensuring learners gain an appreciation of its importance and so that they are equipped with knowledge and understanding to protect themselves and others when working in the industry.

Learning outcomes:

In this unit, learners will be able to

1. Understand health and safety legislation
2. Understand the risk assessment process
3. Understand first aid requirements
4. Understand the principles of safe manual handling
5. Understand the use of fire extinguishers

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand health and safety legislation

Topics

1.1 Impact of good and bad practice upon individuals and businesses
1.2 Key legislation relating to health, safety and welfare
1.3 Statutory duties of employers, employees and the self-employed
1.4 Consequences of not complying with statutory duties
1.5 How individuals can contribute to establishing a good health and safety culture

Topic 1.1

Learners will know direct and indirect consequences of poor standards of workplace health and safety practice on both businesses and individuals, to include:

Financial eg:

- prosecution fines and legal fees
- compensation claims
- repairs/replacement of equipment
- recruit and train new staff
- increased insurance premiums

Emotional eg:

- guilt and grief
- stress

Reputation eg:

- loss of reputation
- bad publicity

Employees

eg:

- reduced staff morale and productivity
- increased staff turnover and sickness

Social eg:

- loss of independence
- reduced social activity

Topic 1.2

Learners will know key legislation relating to health, safety and welfare within the workplace, for example, Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999. Learners will understand the importance of accident and incident reporting in accordance with the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013. Learners will understand the legal status and practical implications of approved codes of practice and industry specific best practice guidance.

Topic 1.3
Learners will know the statutory duties of employers, employees and the self-employed, to include:
Employers:

- provide a safe working environment
- provide safe equipment and systems of work.
- provide information, instruction, training and supervision.
- arrange for the safe storage, transport and use of articles and substances.
- provide adequate welfare facilities.

Employees:

- take reasonable care of their own health and safety.
- take reasonable care of other people who may be affected by what they do or don't do at work.
- cooperate with their employer on health and safety.
- not interfere with or misuse anything provided for their health, safety or welfare

Topic 1.4
Learners will know the powers of health and safety enforcement officers (eg inspection, investigation and guidance) and identify the range of enforcement actions and penalties that may be imposed (eg prohibition and improvement notices, intervention fee and prosecutions).

Topic 1.5
Learners will understand how individuals can contribute to establishing a good health and safety culture within their workplace, for example:

- prompt reporting of defective safety equipment or other matters of concern
- always use control measures and personal protective equipment (PPE) as instructed
- help others to work safely by sharing knowledge and good practice

Learning outcome:

2. Understand the risk assessment process

Topics

2.1 Principles of risk assessment
2.2 Workplace hazards
2.3 Risk assessment

Learning outcome 2 provides learners with the knowledge on the requirements and importance of carrying out risk assessments. Learners will be expected to carry out risk assessments in practice when performing their industry specific activities as required.

Topic 2.1
Learners will understand the legal requirement to carry out suitable and sufficient risk assessments. They will understand the responsibilities of the employer, self-employed and employee within the risk assessment process and identify when expert advice and guidance may be required (eg lack of experience or knowledge).

Topic 2.2
Learners will know common hazards associated with a workplace which could result in serious harm to themselves or others (eg visitors, colleagues, members of the public).

Topic 2.3
Learners will understand how to undertake a detailed risk assessment within the context of their workplace, following the Health and Safety Executive 'Five Steps to Risk Assessment', to include:

- identification of the hazards
- identification of who might be harmed and how they might be harmed
- evaluation of the risks and decide how the level of risk may be controlled
- recording and implementation of the results, as well as communication to others who may be affected
- reviewing risk assessments and suggesting when risk assessments should be reviewed.

Learners will also know the hierarchy of risk control:

- elimination
- substitution
- safe working procedures
- training, instruction and supervision
- personal and respiratory protective equipment (PPE/RPE).

Learning outcome:

3. Understand first aid requirements

Topics

3.1 Planning for emergencies and first aid provision in the workplace
3.2 Procedures when encountering an accident or medical emergency
3.3 First aid for common emergencies

In this outcome learners will explore the importance of planning to and subsequently how to manage common first aid emergencies which may arise in the workplace, with emphasis upon their workplace. Learners should be aware of the aims of first aid (ie, preserve life, prevent injuries worsening and promote recovery) Evidence towards this outcome could come from a current first aid training qualification (ie, appointed persons or first aid at work).

Topic 3.1
Learners will understand the importance of emergency planning, especially for lone or isolated working, and the responsibilities of a first aider. Learners will also know the minimum requirements for first aid at work and identify supplementary arrangements which may be appropriate for their workplace.

Topic 3.2
Learners will know the procedures to follow when encountering an accident or medical emergency. Learners will know how to check the incident site to minimize risk to themselves, assess the situation, and how and when to contact the emergency services and identify prioritisation of activities (eg, 'DRABC').

Topic 3.3

Learners will know how to manage the following common situations as well as other significant situations appropriate to their workplace:

- wounds and burns
- choking
- severe bleeding
- shock
- concussion
- unconscious casualties
- falls from height
- suspected broken limbs and dislocations
- heart attacks.

Learners will know how to recognise their own limitations and explain how to monitor the condition of the casualty and prevent an injury from worsening.

Learning outcome:

4. Understand the principles of safe manual handling

Topics

4.1 Principles of safe manual handling

4.2 Safe manual handling of common items

In this outcome learners will need to investigate the principles of risk assessment relevant to manual handling in order to plan for and safely move a range of common items associated with their workplace. Learners should have access to a range of common mechanical aids and these should be used as appropriate.

Topic 4.1

Learners will understand how manual handling at work should be minimised and identify appropriate alternatives and mechanical aids. They will know the common causes of injuries associated with poor manual handling within the workplace.

Topic 4.2

Learners will understand how to safely move a range of common items within their workplace. They will know appropriate mechanical aids for a range of common manual handling activities within their workplace.

Learning outcome:

5. Understand the use of fire extinguishers

Topics

5.1 Use of fire extinguishers

Topic 5.1

Learners will know the types, use and colours of portable fire extinguishers, to include:

- water
- dry powder
- foam
- CO_2.

Learners will know how to recognise their own limitations in managing fires in the workplace.

Guidance for delivery

On completion of this unit, the learner will have developed an understanding of some of the key underlying principles and practices of health and safety to help prepare them to enter the workplace. It will be important that delivery relates to example situations that are vocationally relevant to the learners.

Visiting speakers eg paramedics, health and safety consultants or inspectors could enhance the relevance of the subject to learners.

Suggested learning resources

Books

Farmwise - Your Essential Guide to Health and Safety in Agriculture Published by: Health and Safety Executive Books, 2013 ISBN: 0717665097	Health and Safety Executive
Health & Safety at Work Essentials Published by: Lawpack Publishing Ltd., 8th Edition, 2014 ISBN: 1910143006	Chadder, P & Duncan, M
Health and Safety at Work: An Essential Guide for Managers Published by: Kogan Page, 9th edition, 2010 ISBN: 0749461195	Stranks, J

Websites

Health and Safety Executive (HSE)	http:// www.hsegov.uk
The Royal Society for the Prevention of Accidents (ROSPA)	http://www.rospa.com

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Unit 302 Undertake and Review Work Related Experience in the Land-based Industries

UAN:	F/507/4635
Level:	3
GLH:	30

What is this unit about?

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

In this unit, learners will be able to

1. Determine employment opportunities in the environmental and land-based industries
2. Prepare for a work-based experience in the environmental and land-based industry
3. Understand the importance of effective interpersonal skills in the workplace
4. Review a work-based experience in the environmental and land-based sector

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Determine employment opportunities in the environmental and land-based industries

Topics

1.1 Career and progression opportunities within an environmental and land-based industry

In this outcome, 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. Learners should be encouraged to explore the range of employment opportunities and career paths within their specialist sector. 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. This should help them to identify suitable work experience.

Topic 1.1

Learners will know the job roles relevant to the land based sector, to include:

- managerial
- supervisory
- team worker
- trainee
- volunteer
- common job titles within the relevant sector,
- main duties and responsibilities.
-
- Learners will also know the skills, qualifications and experience needed to fulfil duties and responsibilities of appropriate jobs, to include:
- job specific
- vocational
- personal.

Learning outcome:

2. Prepare for a work-based experience in the environmental and land-based industry

Topics

2.1 Appropriate work-based experience and the application process
2.2 Interview skills

This outcome 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. It will be beneficial for learners to attend a real or simulated interview, and reflect on their performance outlining how they could improve their effectiveness.

Topic 2.1

Learners will find a suitable job opportunity based on existing skills, experience, qualifications, development of skills and experience to achieve future employment goals. They will use a range of sources of information about work opportunities eg trade magazines, websites Learners will, complete an application form (if applicable), curriculum vitae and letter of application.

Topic 2.2

Learners will know how to prepare for an interview eg research the business and job role, suitable dress and personal presentation, information to find out and suitable questions to ask.

Learners will also know how to behave in an interview, eg:

- attend punctually
- dressed appropriately
- answering questions
- completion of other tests (eg practical, aptitude)
- reflection on interview performance.

Learning outcome:

3. Understand the importance of effective interpersonal skills in the workplace

Topics

3.1 The importance of effective interpersonal skills in the workplace

It would be appropriate for employers to be invited to outline to learners their expectations in the workplace.

Topic 3.1

Learners will understand the importance of effective interpersonal skills in the workplace when dealing with customers and colleagues, to include:

- effective communication (eg addressing others face to face, appropriate telephone manner, effective written communication, use of social media)
- courtesy and helpfulness
- appropriate dress and body language
- product knowledge
- use of technical terms

Learning outcome:

4. Review a work- based experience in the environmental and land-based sector

Topics

4.1 Present evidence of activities and achievements during a work-based experience
4.2 Review a work-based experience, identifying strengths and areas for improvement
4.3 Evaluate future career aspirations

In this outcome, learners will use evidence from their work experience to present a report (eg written or visual), 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, eg 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.

Topic 4.1

Learners will present evidence of activities and achievements during a work-based experience to include,

as appropriate: name of work experience provider, nature of the organisation (type of business, products or services, customers), organisation structure chart, main duties and responsibilities, regular daily working routine, evidence of safe working practices (eg PPE, risk assessments).

Topic 4.2

Learners will review their work-based experience, identifying strengths and areas for improvement, to include:

- work rate
- work quality and effectiveness
- punctuality
- attendance
- reliability
- dress and personal presentation
- working relationships with others work experience aims
- objectives and targets.

Topic 4.3

Learners will evaluate career aspirations, to include:

- advantages and disadvantages of identified pathways
- suitability to personal interests
- skills and qualifications.

Guidance for delivery

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.

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, eg 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 a minimum of 150 hours of 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.

It is recommended that a summary report is completed by the employer at the end of the work placement.

Unit 303 Animal Health and Husbandry

UAN:	L/507/7103
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is 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 a range of 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

In this unit, learners will be able to

1. Recognise indicators of health in animals
2. Understand common disease and disorders, their treatment and prevention
3. Monitor and record the health and wellbeing of animals
4. Recognise how to deliver and record basic animal treatments
5. Carry out animal husbandry tasks

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

The unit should cover a range of species as appropriate to the area of study:

- Horse care: horses, ponies (and donkeys if appropriate)
- Animal care: companion (dog or cat), small mammal (rabbit and rodents), exotics, large mammals (goat, camelids, donkey, pig, other available large mammals).

Learning outcome:

1. Recognise indicators of health in animals

Topics

1.1 Signs of health in animals

1.2 Legislation that relates to animal health

Learners will be required to recognise signs of 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 practices and dealing with animals in a way which reduces stress and minimises injury to the learner, animals and others.

Topic 1.1

Learners must be able to recognise and demonstrate the following health indicators in animals, to include the normal range of the following:

- Temperature: procedure for taking and recording, including the use of digital and mercury thermometers
- Pulse Rate: procedure for taking and recording appropriate to animal species
- Respiration rate: procedure for taking and recording
- Capillary refill time (CRT): procedure for taking and recording.

Learners will need to be able to demonstrate and record routine health checks, to include:

- Appetite and water intake
- Behaviour
- Movement and gait
- Appearance of eyes, ears, nose, mouth / teeth
- Appearance of mucous membranes - Identify different mucous membrane colours and give an example of a condition related to the colour – white, pink, red, blue and yellow
- Appearance of skin/ fur/ feathers/ scales
- Limbs/feet
- Faeces and urine
- Genitals and anal area
- Signs of coughing, sneezing or vomiting
- Body condition
- Weight.

Learners need to know who to inform of any ill-health or problems recorded.

Topic 1.2

Learners must be able to summarise the aims and purpose of the following legislation, linking to other learning outcomes within this unit.

The following is a guided list of the legislation that applies in the Animal Care sector. For purposes of assessment, there is no requirement for detail; however, learners should be able to summarise the aims and purpose of the legislation, linking to other learning outcomes within this unit.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

Legislation

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- Animal Welfare Act 2006 and Animal Health and Welfare Act (Scotland) (2006)
- Welfare of Animals (Transport) Order 2006
- The Welfare of Animals at Market Order 1993
- The Veterinary Surgeons Act 1966
- The Welfare of Farmed Animals Regulations 2007
- The Welfare of Animals Regulations 1999 (slaughter or killing).

For horse care, they would also need to cover:

- Animal Welfare Act 2006 and Animal Health and Welfare act (Scotland) (2006)
- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- Welfare of Animals (Transport) Order 2006
- The Welfare of Animals at Market Order 1993
- The Veterinary Surgeons Act 1966
- Horse Passport Regulations 2009
- The Welfare of Animals Regulations 1999 (slaughter or killing).

Learners may look at other legislation appropriate to their selected species.

Learning outcome:

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

Topics

2.1 The role of pathogenic organisms in animal disease
2.2 Common diseases and disorders in animals and their impact on health and welfare
2.3 Reasons and methods of preventative care and treatment measures used for animals
2.4 Causes, signs and treatment of animal nutritional deficiencies, excesses and disorders

Learners will cover a wide range of diseases and disorders that affect animals.

Topic 2.1

Learners must understand the role and relationship between the following pathogenic organisms and the immune system.

Pathogenic organisms:

Learners need to differentiate between the following pathogens, for each pathogen they need to include common types, structure and replication:

- Bacteria
- Viruses
- Fungi
- Protozoa
- Parasites.

Learners need to have a greater understanding of parasites to include:

- Endoparasites and ectoparasites – to include worms, fleas, ticks, mites, lice
- Lifecycles of the parasites
- Symptoms, treatment and prophylaxis.

Learners need to be able to identify how diseases spread and their symptoms to the disease, to include:

- Methods of disease transmission; direct, indirect, airborne, vectors, fomites, inhalation, ingestion, environment
- Immunity (passive, natural, active and artificial)
- Symptoms (asymptomatic carrier).

Topic 2.2

Learners need to be able differentiate between a notifiable disease and zoonotic disease, making reference to DEFRA and the procedure for notification.

Learners need to explain the following in relation to the named diseases:

- Signs and symptoms
- Treatment
- Prevention and control of disease.

Notifiable diseases to include (relevant to species):

- Rabies
- Avian flu
- Swine Flu
- Bovine Spongiform Encephalopathy (BSE)
- Tuberculosis
- Bluetongue
- Foot and Mouth
- Newcastle Disease
- Equine Infectious Anaemia.

Zoonotic diseases to include (relevant to species):

- Ringworm
- Salmonella
- Camplyobacter
- Cat Scratch Fever
- Leptospirosis
- Lymes Disease
- Psittacosis
- Cheyletiella
- Sarcoptic mange
- Toxoplasmosis.

Learners should be able to identify and explain of common diseases and disorders specific to chosen specie, to include:

- Signs and symptoms
- Treatment
- Control.

Topic 2.3

Learners must identify the different types and frequency of vaccination administration and diseases that the following animals are vaccinated against, which may include:

- Dog
- Cat
- Rabbit
- Horses.

Topic 2.4

Learners will be able to describe causes, signs and treatment of nutritional disorders relevant to species which may include:

- Anorexia
- Obesity
- Vitamins deficiencies and excess
- Minerals deficiencies and excess
- Protein deficiency (Taurine and Arachidonic acid)
- Constipation
- Diabetes
- Urolithiasis
- Laminitis
- Equine metabolic syndrome.

Learning outcome:

3. Monitor and record the health and wellbeing of animals

Topics

3.1 Plans to promote and maintain animal health and wellbeing
3.2 Monitor and record animal health and wellbeing

Learners 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 over a period of time, identifying the current situation, health and welfare targets within given time frames and allow for reassessments over time.

Topic 3.1

Learners should understand the importance to monitor and record animal health and welfare using a health record card. The animal health plans should include:

- Animal identification details
- Date of observation
- Time of observation
- Weight of animal

- Previous history to include: current medication, breeding, allergies
- Medication administered (if applicable)
- Behaviour/temperament
- General demeanour
- Overall health status
- Diet – appetite / thirst
- Urination/defecation/vomiting
- Exercise.

The health plan should be updated over a period of time depending on the species and health status.

Topic 3.2

Learners must be able to design and evaluate an animal health plan.

Learners must implement an animal health plan (this can be issued by the centre) and record appropriately over a period of time using animals from the range.

Learners should have an understanding how the following records are used should an animal require veterinary treatment:

- Veterinary records
- Feeding and water intake records
- Monitoring of clinical signs against expected recovery
- Frequency of defecation and urination
- Pain management
- Adverse reactions.

Learning outcome:

4. Recognise how to deliver and record basic animal treatments

Topics

4.1 How to deliver a range of basic routine and non-routine animal treatments safely in line with codes of practice and legislation

Learners will be able to deliver and record basic treatments to animals. Learners 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. It is suggested that simulation is used for the delivery of this outcome.

Topic 4.1

Basic routine treatments:

- Routes of medicine administration to include topical, enteral, and parenteral and restraint techniques.
- Frequency of drug administration depending upon the drug choice and route
- Sourcing treatments to include: Vets, pharmacies, SQP, feed merchants
- Assessing animal for adverse reactions and the action to take with a suspected reaction and who to notify.

Non-routine animal treatments:

Learners must have an appreciation of the limitations of responsibilities and expectations in a first aid situation:

- Aims and rules of first aid
- Limitations of first aid
- Classification of first aid situations – minor, immediate and life-threatening condition's
- Assessing the first aid situation
- Examination of an injured animal.

Learners need to be able to identify and state the utilisation of the items needed in a First Aid box, to include (as appropriate for species):

- Selection of bandages
- Cotton wool
- Sterile dressing materials
- Adhesive tape
- Rectal thermometer
- Tweezers
- Gloves
- Scissors
- Hand sanitizer
- Eye wash, antiseptic solution
- Poultice
- Contact details for the local veterinary practice
- Carrier bag
- Blanket

Learners to suggest appropriate actions for the common first aid situations, which may include:

- Shock
- Road Traffic Collision (RTC)
- Convulsions
- Fractures
- Wounds
- Dislocations
- Choking
- Poisoning
- Burns and scalds
- Bites and stings

- Foreign bodies
- Haemorrhages.

Learners to demonstrate:

- Bandaging techniques (this may include foot, limb, ear / head, abdomen and tail) and the different layers that are used – primary layer, secondary layer and tertiary layer to include padding
- Cleaning of wounds
- Consideration of working with an unpredictable animal and precautions to take
- The use of handling and restraint techniques and equipment.

Learning outcome:

5. Carry out animal husbandry tasks

Topics

5.1 Manage and maintain animal accommodation

5.2 Handle and restrain animals

Learners will be able to manage and maintain animal accommodation to promote animal welfare and maintain animal health. They will also be able to handle and restrain animals appropriately to minimise stress and maintain safety of animal and themselves.

Topic 5.1

Learners will identify the animal requirements and plan the accommodation to include:

- Animal welfare requirements:
  - Space
  - Size
  - Stocking densities
  - Social needs of animals
  - Life stages of animals
  - Opportunities for movement and exercise
  - Purpose for which the animal is being kept
  - Minimising stress
  - Provision of food and water
  - Enrichment.

- Environmental factors:
  - Humidity
  - Ventilation
  - Pollution
  - Prevailing weather
  - Temperature
  - Sunlight

- Accommodation plans:
  - Location taking into account predator/ prey contact
  - Location of services eg electricity, water
  - Weather elements eg direct sunlight, rain, extremes of temperature
  - Ease of access
  - Waste disposal
  - Security
  - Design and construction

- Fixtures and fittings
- Costs.

Learners will need to prepare and maintain suitable accommodation for chosen animal species, to include:

- Preparation:
  - Standard and alternative fixtures and fittings
  - Bedding materials
  - Lifestyle
  - Life stage of animal
  - Number of animals to minimise stress and to promote animal welfare
  - Suitable for long or short term use
  - Enrichment.

- Maintenance:
  - Safety and security checks; safe for animals, 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, wear and tear
  - Cleaning routines: complete clean, skip out, when animal accommodation should not be cleaned
  - Use of safe working practices throughout cleaning process in line with Health and Safety recommendations eg health and safety at work act, RIDDOR, COSHH, centre risk assessments.

Learners need to monitor and evaluate animal accommodation and the report the findings to the appropriate person following centre procedures, this may include:

- Safety security
- Environmental factors
- Sex and mix of animals
- Cleanliness and suitability of accommodation
- Health and wellbeing of animals eg signs of stress, stereotypical behaviour
- Suitability of construction materials, fixtures and fittings, bedding materials.

Topic 5.2

Learners need to plan for the handling and restraining of selected animal species, to include:

- Assess temperament
- Identify equipment to be used and size
- Assess if assistance is required
- Location
- Purpose for handling and restraint
- Welfare considerations.

The equipment that could be used for handling and restraining animals may include:

- Collar and lead
- Nets
- Muzzles
- Hooks
- Crush cage
- Goads
- Noose
- Crook
- Pillow case
- Box
- Personal Protective Equipment (PPE) eg steel top cap boots, overalls, gloves, hard hat).

Learners need to plan the movement (from one cage/ pen to another) and transport (from one location to another) of selected animal's species, to ensure that legislation and animal welfare codes of practice are met, to include:

- Reasons for movement eg exercise, change enclosure
- Methods of movements
- Equipment available
- Time of day for move
- Size and weight of animal(s) being moved
- Health status of animal(s)
- Safety of area
- Available persons and their skills/ knowledge
- Legislation eg The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018, EU Regulation 1/2005 – The Welfare of Animals (Transport) Order 2006, Dangerous Wild Animals Act (1976), Animal Welfare Act 2006
- Codes of practice eg, PETS Travel Scheme, Five Animal Welfare Needs.

Learners must handle, restrain and move selected animal species using correct techniques and equipment, complying with relevant legislation, codes of practice and minimises stress and injury.

Guidance for delivery

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.

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.

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.

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.

Unit 304 Animal Feeding and Nutrition

UAN:	D/507/7106
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to develop their knowledge and understanding of the different nutritional needs of animals. The learner will be able to describe the function, digestion and absorption of the major nutrients. Learners will explore the nutritional values of different food types and be able to calculate the dietary requirements for animals at different life stages. This will be used to design, monitor, record and evaluate feeding regimes. Learners will also investigate nutritionally responsive disorders, the effect these have on animals and the impact on their dietary requirements.

Learning outcomes

In this unit, learners will be able to

1. Understand the basics of nutrition
2. Understand the nutritional values and properties of different food types
3. Understand the feeding requirements of animals at different life stages
4. Plan, monitor, record and evaluate diets and feeding regimes for animals

Scope of content

The unit will be focused on building learner knowledge of the basics of nutrition and working towards an understanding of the functions, digestion and absorption of the major nutrients. Learners will explore the nutritional values of different food types and discuss the suitability of these foods in a variety of species. Once learners have an understanding of the need for a balanced diet, the learner will calculate the energy content of different foods and the energy requirements for animals at different life stages. A further consideration when calculating energy requirements will be the impact of nutritionally responsive disorders on both the animal's health and adjustments to dietary requirements.

As learner understanding builds on individual animal needs, learners will design a feeding regime for a chosen animal, monitor the chosen animal, record the results and evaluate the effectiveness of the regime. The goal is by the end of the unit the learners can explain how and why we provide a balanced diet for a variety of species.

The unit should cover a range of species as appropriate to the area of study:

- Horse care - horses, ponies (and donkeys if appropriate)
- Animal care: companion (dog or cat) or, 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 are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

Centres should be up to date with legislation, policies and codes of practice used in the taught content

Learning outcome:

1. Understand the basics of nutrition

Topics

1.1 Contribution of the major nutrients of an animal's diet to maintain health and wellbeing

1.2 Functions of the major nutrients within the animal's body

1.3 Digestion and absorption of the major nutrients within the animal's body

The learner will investigate the functions of the major nutrients in the diet and how they are used in the body of a monogastric animal and a ruminant. The learner will be expected to describe the chemical structure of monosaccharide, disaccharides, fatty acids, amino acids and dipeptides.

Topic 1.1

The learner will be able to describe the major nutrients required for a balanced diet, to include:

- Carbohydrates (monosaccharide, disaccharides and polysaccharides)
- Proteins (amino acids, peptides and polypeptides)
- Fats/lipids
- Vitamins
- Minerals
- Water.

Topic 1.2

The learner will be able to describe the function of the major nutrients, to include:

- Energy
- Growth and repair
- Storage and insulation.

Topic 1.3

Learners will be able to describe the biological digestion and absorption for monogastric animals and ruminants, to include:

- Biological digestion:
  - Tissue layers of the intestinal wall to include the muscosal ducts and glands, lymph, blood vessels , circular muscle layer, longitudinal muscle layer, serosa.
- Monogastric stomach:
  - Digestive system organs and accessory glands
  - Dentition
  - Role of enzymes (Anabolism and catabolism)
  - Acidic and alkaline secretions
  - Absorption of nutrients and water
  - Hindgut fermenters (Role of microbes in digestion)
- Ruminant
  - Digestive system organs, to include compartments of the stomach, caecum, liver
  - Dentition
  - Role of microbial organisms in fibre fermentation
  - Partition of protein in the rumen.

Learning outcome:

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

Topics

2.1 Nutritional components of food, suitability of different types of fresh and prepared foods and the considerations when developing a feeding plan

The learner will be able to compare different feeds with regard to the nutrient content, digestibility and palatability. There is an option to relate to the exotic species or zoological collections unit when looking at species that naturally feed on live prey.

Topic 2.1

Learners should be able to describe the nutritional value and properties of different foods, relating these to the nutritional needs and selection of an appropriate diet for chosen species.

Learners should be able to describe the nutritional content of different types of food, to include:

- Fresh/ natural: fruit, vegetables, forage (grasses), meat (to include public perception and ethics of feeding live food)
- Prepared/ processed: dried, tinned, semi-moist, seeds, nuts, mixed compounds.

Learners should explore the influence of nutritional needs on a feeding plan and the effects of feeding an alternative to the planned diet.

Learning outcome:

3. Understand the feeding requirements of animals at different life stages

Topics

3.1 Calculate rations for animal diets

3.2 Dietary requirements for different life stages and conditions, and how these influence the development of a feeding plan

The learner will calculate rations for animals within the range and will explain how the ration may change at different life stages. Reference sources eg food packets, may be required for the students to derive energy and protein requirements. Calculations will be required, so access to calculators will be needed.

Topic 3:1

The learner will be able to calculate the requirements of an individual animal and choose a diet to meet that requirement. The learner will need to include the following in the diet plan:

- Feed items and ingredients
- Calculate the amount and the content eg energy value (Kcal)
- Assess the quality of the food stuffs
- Compare the nutritional values of wet and dry diets
- 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.

Topic 3:2

The learner will need to calculate the energy requirement of animals at different life stages and conditions, choose an appropriate diet to meet that requirement and compare the requirements of different life stages. Life stages and conditions may include:

- Juvenile
- Adult
- Geriatric
- Breeding/pregnancy/ lactation
- Working
- Obesity
- Anorexic
- Specialist veterinary diets eg diabetes, laminitis
- Recuperation.

Learners need to be able to compare the nutritional values of feed given to animals at a variety of life stages and conditions.

Learning outcome:

4. Plan, monitor, record and evaluate diets and feeding regimes for animals

Topics

4.1 Design a feeding plan

4.2 Understand how to monitor, record and evaluate the effectiveness of a feeding plan

The learner is required to plan the diet or feeding regime, including ingredients, quantities and frequency of feeding for each animal and describe the presentation of food and water to animals. The learner is then required to monitor the effectiveness of their feeding regime and evaluate the effectiveness of the feeding plan as a whole, taking into account the health status, quantities of food consumed, cost of feeding etc.

For this outcome, learners may use animals kept at the centre or individual animal kept outside the centre.

Topic 4.1

The learner will be able to design a feeding plan for a selected species, life stage and condition.
The plan should include:

- Fresh water and its delivery
- Choice of diet
- Appropriate quantities of food (eg fresh and dried or pre-prepared and any supplements required)
- Frequencies of delivering food
- Methods of food delivery (eg enrichment activity)
- Alternatives to the plan dependant on food availability.

Record card should include:

- Consumption of food and water
- Health status
- Animal behaviour
- Frequency and turbidity of urination
- Frequency and consistency of defecation.

Topic 4.2

The learner needs to apply and evaluate a given feeding plan over a period of 4 – 6 weeks. The learner will accurately record the results of observations and evaluate effectiveness of the results, to include:

- Health status (Overall health of the selected animal – has the feeding plan provided a balanced diet, has the diet had a positive/negative effect)
- Quantities of food and water consumption (exactly how much is the animal consuming, is it enough to provide a balanced diet)
- Condition (is the animal gaining or losing weight, is its coat in good condition)
- Calculate costs of feeding against budget and different food types (how much does it cost to feed the animal and is the cost reasonable for the species). This links to topic 3.1 and 3.2.

Guidance for delivery

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.

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.

Unit 305 Animal Behaviour and Communication

UAN:	M/507/7112
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners 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

In this unit, learners will be able to

1. Understand behaviour patterns in animals
2. Observe animal behaviour
3. Understand the factors influencing behaviour
4. Understand social behaviour and animal communication

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

The unit should cover a range of species as appropriate to the area of study:

- Horse care: horses, ponies (and donkeys if appropriate)
- Animal care: companion (dog or cat) or small mammal (rabbit and rodents) or exotics or large mammals (goat, camelids, donkey, pig or other available large mammals).

Learning outcome:

1. Understand behaviour patterns in animals

1.1 Analysis of natural and atypical animal behaviour
1.2 Causes of atypical behaviour in animals
1.3 Behaviour of captive or domestic animal and wild counterpart

Learners will recognise and distinguish between natural and atypical behaviour in animals. The underlying causes of atypical behaviour will also be investigated. Learners will also investigate the difference between the behaviour of an animal in the wild and its domestic or captive counterpart.

Topic 1.1

Learners will need to observe a range of animal species to identify natural and atypical behaviours, to include:

- Foraging
- Hunting
- Sleeping
- Social behaviour
- Grooming
- Courtship
- Territorial
- Hyperactivity
- Excessive inactivity
- Displacement behaviour
- Stereotypic behaviours.

Topic 1.2

Learners will need to be able to identify causes of atypical behaviours relevant to species, to include:

- Confinement
- Unsuitable environment
- Inappropriate social grouping.

Topic 1.3

Learners will need to be able to compare a range of behaviours exhibited by a species in the wild and its domestic or captive counterpart (eg wolf compared to domestic dog, wild wolf compared to a wolf in a zoo, wild cat compared to domestic cat).

Learning outcome:

2. Observe animal behaviour

Topics

2.1 Studying animal behaviour
2.2 Monitoring and recording behaviour in animals
2.3 Interpreting behaviour in animals

Learners will become familiar with reasons and techniques for studying and recording animal behaviour, including the work of noteworthy ethologists, behaviour sampling techniques and analysis of results.

Topic 2.1

Learners will need to have an appreciation of the contribution of noteworthy ethologists eg Lorenz, Darwin, Tinbergen.

Learners need to identify the reasons for studying animal behaviour, which may include:

- Improving captive animal management
- Managing animal populations

- Improving animal welfare.

Learners will need to describe and identify the uses and limitations of behaviour sampling techniques, this may include:

- Focal sampling
- Behaviour sampling
- Scan sampling.

Learners will need to identify behaviour sampling tools and equipment, which may include:

- Video cameras versus in situ observation
- Ethograms
- Recording charts.

Topic 2.2

Learners will need to observe one species of animal for a set period of time and note its behaviours. They will need to recognise whether the behaviours seen are states or events and describe the difference between the two. No interaction with the animal should take place and animal welfare guidelines should be followed.

Topic 2.3

Learners will need to record the behaviour observed using an ethogram. They will need to choose to record either the frequency or duration of behavioural states and events and create an appropriate graph.

Learners will need to produce a report detailing the observation results and offering reasons for behaviours seen.

Learning outcome:

3. Understand the factors influencing behaviour

Topics

3.1 Evolution of behaviour
3.2 Development of behaviour
3.3 Factors influencing behaviour

Learners will investigate how species-specific behaviour have evolved and how behaviour may develop. They will consider how internal and external factors may affect behaviour.

Topic 3.1

Learners will need to investigate how species-specific behaviour have evolved, to include:

- Link between environment and behaviour (adaptation, competition for resources)
- Heredity of behaviour
- Differences between development and evolution
- Darwinian Theory
- Domestication.

Topic 3.2

Learners will need to investigate the development of behaviour, to include:

- Difference between instinctive and learned behaviour
- Trial and error
- Observational learning
- Parental or social teaching
- Cultural behaviour.

Topic 3.3

Learners will need to investigate internal and external factors, these may include:

- Hormones
- Fixed action patterns
- Other animals
- Seasonal variation to include:
  - food availability
  - daylight
  - weather

Learning outcome:

4. Understand social behaviour and animal communication

Topics

4.1 Methods of communication
4.2 Formation and maintenance of social grouping
4.3 Mating and parent-offspring behaviour

Learners will examine social behaviour and communication in animals. The learner will investigate how the senses listed in the unit content are involved in communication and how effective communication is involved in establishing and maintaining social groups and how it 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.

Topic 4.1

Learners will need to define interspecific communication (eg predator-prey) and intraspecific communication.

Learners need to understand the methods of communication, to include:

- Vision (body language, facial expressions)
- Hearing (vocalisations and other sounds)
- Chemical (smell, pheromones, taste)
- Touch (eg allogrooming).

Topic 4.2

Learners will need to have an appreciation of social behaviour, to include:

- Hierarchies (linear versus complex)
- Maintaining dominance relationships (communication methods used by animals to reduce conflict)
- Agonistic behaviour
- Social bonding and affiliative behaviour
- Altruism.

Topic 4.3

Learners will need to have an appreciation of mating systems and strategies:

- Polygamy
- Monogamy
- Non-associative
- Courtship.

Learners will need to have an appreciation of parental behaviour and strategies:

- Biparental
- Intensive
- No parental investment
- Parent-offspring bonding
- Imprinting (to include filial and sexual).

Guidance for delivery

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 atypical 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.

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.

Unit 306 Biological Systems of Animals

UAN:	F/507/7115
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to develop their knowledge and understanding of the anatomical and physiological systems in animals. Learners will also investigate how selected systems, such as sensory organs and the skeleton, have adapted to meet the needs of animals living in different environments.

Learning outcomes

In this unit, learners will be able to

1. Understand the structure and function of biological systems in animals
2. Understand control mechanisms in animals
3. Understand the neural control mechanisms in animals
4. Understand how animals' senses have adapted to their environment

Scope of content

This unit will be focussed on developing learner understanding of how mammalian bodies are structured and how the different biological systems function in a range of animals. The goal is that by the end of this unit, all learners should be able to apply an understanding of adaptations to the structure and function of the biological systems of a range of animals. Learners should be able to explain how and why specific traits arose. The species covered should broadly be mammalian but reference to other living organisms should be made where appropriate.

This unit is designed to provide the learner with knowledge of the anatomical and physiological systems in animals. It will equip the learner with sound knowledge of the basis of how the animal body functions under normal conditions. 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.

Unit range

Species should be broadly mammalian but reference to other living organisms to be made where appropriate, to illustrate comparative anatomy.

Learning outcome:

1: Understand the structure and function of biological systems in animals

Topics

1.1 Structure and function of the circulatory system
1.2 Structure and function of the respiratory system
1.3 Structure and function of the reproductive system
1.4 Structure and function of the excretory system
1.5 Structure and function of the musculoskeletal systems

This learning outcome is to cover the major body systems and reproductive processes in animals. The structures of the body systems can be observed through photographs, preserved specimens, or practical dissections. The use of case studies, comparing healthy organs with diseased or injured counterparts may help learners understand and relate the organs and systems of the functioning animal body. Learners will need to explain the link between the structure and function of the body systems. The learner will appreciate that the animal body has evolved from selective pressures in the natural environment.

Topic 1.1

Learners should be able to identify and describe the components that make up the circulatory system:

- Blood (blood cell formation and composition) – plasma, erythrocytes, leukocytes and platelets
- Components and function of the double circulation system:
  - Heart (four chambers, aorta, vena cava, pulmonary vein, pulmonary artery, bicuspid and tricuspid valves, chordae tendinae, sino-atrial node, atrioventricular node, bundle of His and Purkynje fibres)
  - The role of each of the structures in the heart beat
- Relative structure and function of blood vessels (capillaries, veins and arteries).

Learners should be able to recognise different types of circulatory systems including single circulation; open (Eg arthropods and molluscs) and closed (fish and mammals) circulatory systems

Topic 1.2

Learners should be able to describe the structure and function of the respiratory system and how it has adapted in certain species:

- Mammalian structure – nasal chambers, larynx, trachea, bronchi, bronchioles, lungs, alveoli and diaphragm
- Function – gas exchange in the alveoli and ventilation of the lungs.

Learners should be able to have an appreciation of comparative adaptations: Fish (gills), Amphibians (skin), birds (air sacs), Invertebrates (spiracles, tracheae and book lungs).

Topic 1.3

Learners should be able to describe the location, structure and function of the reproductive systems in a range of animals:

- Male: Penis, prepuce, urethra, bulbus glandus, epididymis, vas deferens, testis (testosterone, oestrogen) and prostate gland
- Female: Vulva, vagina, cervix, uterus, oviduct and ovaries.

Learners should have an appreciation of comparative adaptations (eg, in cats, whales, pigs).

Learners should understand the stages of:

- The oestrus cycle including hormonal control (oestrogen, progesterone, LH and FSH) and human influence on breeding (Eg Hormonal injections in bitches and broodmares)
- Sexual reproduction (copulation, fertilization, implantation, gestation and parturition (prolactin and oxytocin).

Learners should have an appreciation of comparative adaptations (oviparous, viviparous, ovoviviparous, egg-laying mammal and marsupials).

Topic 1.4

Learners must be able to identify the structures which make up the excretory system and describe their functions:

- Kidneys (ultrafiltration and reabsorption), ureters, bladder (voluntary and involuntary control), urethra.

Learners should have an appreciation of comparative adaptations (eg, in birds, desert mammals and aquatic animals).

Topic 1.5

Learners must be able to identify the structure and function of the mammalian musculoskeletal system.

Learners will be able to comment on the advantages and disadvantages of the mammalian skeletal adaptations, as well as applying the basic theory to other animals including extinct species lines. The use of timelines could be used 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.

Learners should describe skeletal adaptations in animals living in contrasting environments, linking structure to function which may include:

- Aquatic mammals (eg cetaceans)
- Flying mammals (eg bats)
- Hopping mammals (eg rabbits)
- Running mammals (eg horses, cheetah).

Learning outcome:

2. Understand control mechanisms in animals

Topics

2.1 Structure and function of hormonal mechanisms in the endocrine system
2.2 Structure and function of the lymphatic system
2.3 Structure and function and adaptations of the thermoregulatory system

This outcome covers the action and effects of control mechanisms in maintaining equilibrium within the body. This will include understanding of the function of hormones within the endocrine system, as well as the immune system and neural control of homeostasis.

Topic 2.1

Learners must be able to describe the structure and function of hormonal mechanisms in the endocrine system:

- Homeostasis in relation to sugar and water levels in the blood
- Requirement of receptors on cell surface
- Circulating hormones (eg, insulin) versus locally acting hormones (eg histamine).

Learners must also be able to locate the major endocrine glands and describe their function:

- Hypothalamus
- Pituitary Gland
- Pancreas
- Adrenal
- Thyroid and para-thyroid
- Ovaries
- Testes.

Topic 2.2

Learners should be able to describe the structure and function of the lymphatic system:

- Structure of glands and vessels
- Functions:
  - Drain excess fluid
  - Aid in fat digestion
  - Transport of materials
  - Immune system (thymus, T-lymphocytes and B-lymphocytes).

Topic 2.3

Learners should be able to describe thermoregulatory systems:

- Homeostasis in relation to temperature control
- Endotherms
- Ectotherms

Learning outcome:

3. Understand the neural control mechanisms in animals

Topics

3.1 Gross anatomy of the brain
3.2 Neural control mechanisms in animals

This outcome covers the gross anatomy of the brain and the main components that make up the nervous system. Models or online dissections could be used to illustrate the structures within the brain, with links made as to functions.

Topic 3.1

Learners should be able to identify functions and describe the gross anatomy of the brain, to include:

- Forebrain (thalamus, hypothalamus, cerebral cortex and limbic system)
- Midbrain (reticular formation and neuron receptors)
- Hindbrain (medulla, cerebellum and pons).

Topic 3.2

Learners should be able to identify and describe the main components which make up the central, peripheral and autonomic nervous systems:

- Central Nervous System
- Peripheral Nervous System (afferent and efferent)
- Autonomic Nervous system (sympathetic and parasympathetic actions).

Learning outcome:

4. Understand how animals' senses have adapted to their environment

Topics

4.1 How animal's senses are adapted to their environment
4.2 Specialised senses

This outcome is to examine the interaction of the animal with its environment. A comparison between predator and prey species should be emphasised at each stage. The structure and function of the mammalian eyes would be enhanced by dissections if facilities allow and simple experiments (eg the blind spot, pupil shape in different animal species).

Topic 4.1

The learner needs to be able to describe the structure and function of the main senses and link them to their stimuli, and also compare between prey and predator:

- 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 (pinna, auditory meatus, tympanic membrane, malleus, incus, stapes, oval window, round window, cochlea, organ of Corti, cochlear nerve and semi-circular canals)
- Nose (nasal chambers, turbinates, olfactory nerve and olfactory bulb)
- Mouth (taste buds, soft palate and hard palate)
- Touch (Skin receptors).

Topic 4.2

The learner needs to describe a range of specialised senses and appreciate why they have evolved, to include two animals in contrasting environments (eg arid/ aquatic, cold/hot, high/ low altitudes, high/ low pressure):

- Tactile organs (Eg Platypus beak, lateral line in fish and vibrissae)
- Taste and smell (Eg Jacobson organ)
- Electroreception (ampullae of Lorenzini)
- Echolocation (bats and dolphins).

Guidance for delivery

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 line with the centres' ethical policies. Tutors should consider integrating the delivery and private study of this unit with other relevant units. It is particularly recommended that the unit covering Cellular Biology should be included for any learner looking to progress in a science based career or further training.

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.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

Unit 307 Animal Welfare and Breeding

UAN:	J/507/7116
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to know about evolution, how animals have 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

In this unit, learners will be able to

1. Understand animal evolution and the development of domestic breeds
2. Understand the roles of animals in human society
3. Understand current United Kingdom animal welfare legislation
4. Understand the roles and aims of animal welfare organisations
5. Understand how to manage breed stock and young animals
6. Understand the uses of reproductive technology.

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand animal evolution and the development of domestic breeds

Topics

1.1 The principles of animal evolution
1.2 Development of selected domesticated breeds
1.3 The effect of domestication on the welfare needs of animals

Topic 1.1

Learners need to outline the principles of animal evolution to include:

- Darwin's theories of evolution
- Natural selection
- Survival of the fittest
- Mutations
- Adaptations.

Learners need to understand the causes of species extinction, to include:

- Pollution
- Introduction of non-native species
- Habitat destruction and climate change and natural disasters (eg earthquakes, flooding).

Topic 1.2

Learners need to understand the development of selected domestic breeds, to include:

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

Topic 1.3

Learners need to understand the effect of domestication on the welfare needs of animals, to include:

- Hereditary conditions in breeds (eg 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.

Learning outcome:

2. Understand the roles of animals in human society

Topics

2.1 The commercial use of animals and animal products in human society and how their welfare maybe affected
2.2 The role of working animals in human society and how their welfare maybe affected
2.3 The roles of animals in human cultures and how their welfare maybe affected

Topic 2.1

Learners need to understand the commercial use of animals and animal products in human societyand how their welfare maybe affected, to include:

- 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).

Topic 2.2

Learners need to understand the role of working animals in human society and how their welfare maybe affected, to include:

- 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.

Topic 2.3

Learners need to understand the roles of animals in human cultures and how their welfare maybe affected, to include:

- 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 eg 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.

Learning outcome:

3. Understand current United Kingdom animal welfare legislation

Topics

3.1 United Kingdom animal welfare legislation

3.2 The objectives of selected current United Kingdom animal welfare legislation

Topic 3.1

Learners need to explain current relevant United Kingdom legislation, to include:

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- 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
- Dangerous Dogs Act 1991.

Topic 3.2

Learners need to explain the main aims and objectives of current relevant United Kingdom legislation to include:

- Duty of Care and carer's responsibilities
- Definitions
- Exceptions
- Licences
- Penalties.

Learning outcome:

4. Understand the roles and aims of animal welfare organisations

Topics

4.1 Roles and aims of specified animal welfare organisations

4.2 The effectiveness of specified animal welfare organisations in the promotion of animal welfare

Topic 4.1

Learners need to understand the roles in education and increasing public awareness for specific animal welfare organisations, which may include:

- Royal Society for the Prevention of Cruelty to Animals (RSPCA)
- World Society for the Protection of Animals (WSPA)
- International Fund for Animal Welfare (IFAW)
- 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)
- The 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.

Topic 4.2

Learners need to compare organisations' effectiveness, which may include:

- Media attention
- Campaigns
- Role in amending legislation and influences through education eg the banning of cosmetic testing on animals.

Learning outcome:

5. Understand how to manage breed stock and young animals

Topics

5.1 Factors to consider when selecting and managing breed stock
5.2 Management of female from conception to birth
5.3 Potential problems that could occur in the management of the female from conception to birth
5.4 The care requirements of offspring from birth to weaning
5.5 Problems that could occur in the offspring from birth to weaning

Topic 5.1

Learners need to understand the reasons for breeding eg production, pet trade, animal shows, work, companion, endangered species and conservation.

Learners need to understand how breeding stock is selected eg breeding females, stud male, genotypes and phenotypes.

Topic 5.2

Learners need to describe how to manage a female animal from conception to birth, to include:

- The 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.

Topic 5.3

Learners need to have an appreciation of the potential problems that can occur:

- Infertility
- Problems with mating (eg non-compatible males and females)
- Eclampsia
- Dystocia
- Post-partum problems (eg retained placenta, uterine prolapse)
- Pyometra.

Topic 5.4

Learners need to describe the care requirements of offspring from birth to weaning, to include:

- Rearing
- Importance of colostrum
- Weaning, socialisation
- Early training
- Homing
- Regular checks eg weight gain, size, ears and eyes opening, eating normally and passing of urine and faecal waste.

Topic 5.5

Learners need to have an appreciation of problems that could occur in the offspring from birth to weaning, which may include:

- 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.

Learning outcome:

6. Understand the uses of reproductive technology

Topics

6.1 Types of breeding problems that can occur
6.2 Types of reproductive technologies that are available for animal breeders
6.3 How reproductive technologies can be used by animal breeders

Topic 6.1

Learners need to have an appreciation of the types of breeding problems that can occur, which may include:

- Infertility
- Restricted gene pool
- Health problems in the female, eg pseudo-pregnancy, ovarian imbalance, adult acromegaly, ovarian tumours
- Health problems in the male eg balanitis, phimosis, prostate problems, cryptorchidism, monorchidism, orchitis.

Topic 6.2

Learners need to describe the types of reproductive technologies that are available for animal breeders, which may include:

- Infertility treatments
- Superovulation
- Synchronisation
- Ovulation indicators
- Artificial insemination
- Embryo transplants
- Cloning
- Genetic analysis
- Genetic engineering.

Topic 6.3

Learners need to have an appreciation of how reproductive technologies can be used by animal breeders, which may include:

- Breed development and improvement
- Use of animals for breeding (eg use of teaser animals, surrogate mothers)
- To increase productivity
- To ensure timing of births enhances management of offspring.

Guidance for delivery

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.

Learning 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).

Learning 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.

Learning 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 Learning 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).

Learning outcome 5 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 (eg an animal breeder) would also be beneficial. Audio visual material will be useful.

In Learning outcome 6, 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 (eg an animal breeder or someone who practices artificial insemination) would also be beneficial.

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.

Unit 308 Wildlife and Ecology Conservation

UAN:	L/507/7120
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners 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

In this unit, learners will be able to

1. Understand changes in global ecosystems
2. Understand national and international conservation strategies for wildlife and their habitats
3. Understand population dynamics
4. Conduct a field study of habitats

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

Learning outcome:

1. Understand changes in global ecosystems

Topics

1.1 Global changes in ecosystems
1.2 Wildlife population changes in ecosystems
1.3 Reasons for global wildlife population fluctuations

This outcome 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

Topic 1.1

Learners need to understand the global changes in ecosystems, may include:

- Population shifts
- Trends
- Speciation
- Scales
- Individuals
- Species
- Communities
- Ecological niches
- Demes
- Drought
- Famine

Topic 1.2

Learners need to understand wildlife population changes in ecosystems and population dynamics, to include:

- Metapopulations
- Seasonality
- Growth
- Dissolution
- Dispersal
- Genetic variability
- Continuity in time
- Fecundity
- Natality
- Mortality – stochastic population changes

Topic 1.3

Learners need to explain the reasons for global wildlife population fluctuations, to include:

- Seasonality
- Migration
- Emerging diseases
- Climate change
- Habitat destruction
- Influence of man.

Learning outcome:

2. Understand national and international conservation strategies for wildlife and their habitats

Topics

2.1 National conservation strategies for wildlife and their habitats

2.2 International conservation strategies for wildlife and their habitats

In this outcome, 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.

Range for outcome

Conservation strategies: in situ and ex situ conservation.

Topic 2.1

Learners need to understand national conservation strategies for wildlife and their habitats, to include:

- Biodiversity action plans
- Wildlife Trust
- Royal Society for the Protection of Birds (RSPB)
- Application of relevant legislation (Environment Act (1995), Wildlife and Countryside Act 1981 (as amended 1991)).

Topic 2.2

Learners need to understand international conservation strategies for wildlife and their habitats, these may include:

- 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.
- National Wildlife Federation

Learning outcome:

3. Understand population dynamics

Topics

3.1 Predator prey interactions within wildlife populations

3.2 Types of evolution within animal populations

This outcome encourages the exploration of the principles of population dynamics and should be discussed with reference to a range of examples. It should include consideration of the interrelationship of plant and animal (mammals, birds, fish, reptiles, amphibians, invertebrates) species. The learner will explore evolutionary strategies to propose how current population dynamics have formed. Delivery of this outcome could be complimented by practical activities, videos and case studies to encourage the learner to c ontextualise the factors covered. Current and topical issues in population dynamics and conservation should be highlighted.

Topic 3.1

Learners need to understand the principles of population dynamics, may include:

- 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).

Learners need to understand predator prey interactions, may include:

- Positive and negative interactions
- Primary consumers
- Secondary consumers
- Parasite: host
- Natural selection
- Hunting strategies
- Predation theories
- Predator density and prey density
- Prey defences.

Topic 3.2

Learners need to understand the types of evolution within animal populations, to include:

- Divergent
- Convergent
- l (influences on Predator Prey Strategies).

Learning outcome:

4. Conduct a field study of habitats

Topics

4.1 Plan and carry out an ecological survey of habitats

This outcome 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.

Topic 4.1

Learners need to plan and carry out an ecological survey of habitats, to include:

Plan:

- Objective setting and planning
- Risk assessment
- Health and safety
- Legislation
- Codes of practice.

Carry out:

- Sampling (eg quadrat, kick, transect)
- Data analysis methods.

Guidance for delivery

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.

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. Learner need to know how they could be involved and shown how they can access the volunteering modules that many conservation agencies in the UKk offer.

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 eg Conservation organisations such as Wildlife trusts, National Trust, RSPB and volunteer organisations 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.

Unit 309 Wildlife Management and Rehabilitation

UAN:	K/507/7125
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to conduct a field study of wildlife populations. Learners will understand how to rehabilitate wildlife populations. Learners will also understand the wildlife populations, how wildlife and humans interact and how to manage wild animal populations.

Learning outcomes

In this unit, learners will be able to

1. Conduct a field study of wildlife populations
2. Understand how to rehabilitate wildlife
3. Understand wildlife and human interaction
4. Understand how to manage wild animal populations

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

Learning outcome:

1. Conduct a field study of wildlife populations

Topics

1.1 Plan and carry out a wildlife population survey

Topic 1.1

Learners need to plan and carry out a wildlife population survey, to include:

Plan:

- Type of animal (eg terrestrial or aquatic: mammals, birds, fish, reptiles, amphibians, invertebrates)
- Type of survey (eg mark - recapture, mark – re-sight)
- Wildlife signs survey
- Entire population counts
- Distance sampling
- Harvest models
- Capture techniques (eg traps, pit-fall, nets)
- Habitat type (eg woodlands, freshwater, estuary and coastal, hedgerows and verges, marshes, grasslands, heathlands, uplands)
- Season (eg effect of foliage on viewing, temperature, rainfall, breeding and mating seasons)
- Time of day (eg nocturnal, diurnal and crepuscular species)
- Equipment to be used (eg traps, markers, viewing equipment, Personal Protective Equipment (PPE)).

Carry out a survey, which may include:

- Phase 1 surveys
- Habitat surveys
- Species surveys
- Population surveys.

Learning outcome:

2. Understand how to rehabilitate wildlife

Topics

2.1 Initial assessment of wildlife casualties

2.2 Rehabilitation plan for a wildlife casualty

This outcome requires learners to carry out an initial assessment of a wildlife casualty and then create a rehabilitation plan.

Topic 2.1

Learners need to understand the is in process and procedure of an initial assessment of wildlife casualties, to include:

- Physical signs (eg bleeding, loss of fur/feathers, limping, vomiting, heavy breathing)
- Temperature
- Pulse
- Respiration
- Behaviour

Learner need to understand how a veterinary diagnosis is made, to include:

- Clinical tests (eg blood tests for viruses, bacteria, parasites and health eg mineral levels, urine analysis for hormone levels and faecal analysis for parasites)
- Equipment used (eg crush cage, noose, catch pole, towel, gloves/gauntlets, muzzles, goads, nets, bags, hoods and PPE).

Topic 2.2

Learners need to create a rehabilitation plan for a wildlife casualty, to include:

- Treatment
- General husbandry (feeding, water, disease prevention and hygiene, enrichment and behaviour)
- Barrier nursing to prevent imprinting and habituation to humans
- Assessment and preparation for release
- Legislation.

Legislation

The following is a guided list of the legislation that applies in the Animal Care sector. For purposes of assessment, there is no requirement for detail; however, learners should be able to summarise the aims and purpose of the legislation, linking to other learning outcomes within this unit.

Centres should be up to date with legislation, policies and codes of practice used in the taught content:

- Wildlife and Countryside Act 1981
- Conservation of Habitats and Species Regulations 2010
- Protection of Badgers Act 1992
- Deer Act 1991
- Conservation of Seals Act 1970
- Wild Mammals Protection Act 1996
- Animal Welfare Act 2006
- Destructive Imported Animals Act 1932
- Veterinary Surgeons Act 1966.
- Learners may look at other legislation appropriate to their selected species

Learning outcome:

3. Understand wildlife and human interaction

Topics

3.1 Human threats to wildlife populations and individuals

3.2 Ethical implications of wildlife intervention strategies

In this outcome, 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.

Topic 3.1

This topic directly links to learning outcome 1.

Learners need to understand human threats to wildlife populations and individuals, including:

- Factors that affect populations
- Road Traffic Collisions (RTC)
- Hunting
- Illegal trade
- Habitat destruction.

Topic 3.2

Learners need to have an appreciation of the ethical implications of wildlife rescue and rehabilitation strategies, to include:

- 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
  - Ethics: (This is a very difficult subject and opinions differ widely about what is and is not a justifiable level of intervention in the fate of individuals and thus the population dynamics of their species).

Learning outcome:

4. Understand how to manage wild animal populations

Topics

4.1 Wild animal species and behaviour patterns

4.2 Species habitat requirements

4.3 Population management plan for a wildlife species

In this outcome, 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 could 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.

Topic 4.1

Learners need to be able to describe wild animal species and behaviour patterns, to include:

Wild animal species:

- Common and scientific names
- Binomial nomenclature
- Identifying characteristics
- Linnaean classification.

Behaviour patterns:

- Diurnal, nocturnal or crepuscular
- Feeding behaviour
- Mating behaviour
- Territoriality
- Dominance and migration.

Topic 4.2

Learners need to be able to describe the species habitat requirements, to include:

- Environment (eg flora, shelter, soil)
- Proximity to predators
- Other territories
- Human populations.

Topic 4.3

Learners need to explain how to design a population management plan for a wildlife species, to include:

- Food availability
- Population control (eg culling, cropping, sterilisation)
- Surveying (eg aerial surveys, mark recapture, identifying animals)
- Recording (eg paper based, computer based)
- Disease control (vaccinating, prophylactic treatments, isolation of populations to prevent disease spread and culling)
- Capture
- Predator prey relationships
- Migration and emigration.

Guidance for delivery

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.

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. Learner need to know how they could be involved and shown how they can access the volunteering modules that many conservation agencies in the UK offer.

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 eg Conservation organisations such as Wildlife trusts, National Trust, RSPB and volunteer organisations 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.

Unit 310 Exotic Animal Health and Husbandry

UAN:	T/507/7127
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to understand the husbandry and management of exotic animals in captivity. This unit aims to extend the learners knowledge and skills involved with ensuring the health and welfare of exotic animals as well as reproduction, handling, restraint and nutrition. It is important that the learner understands current legislation and Codes of Practice in relation to animal health and welfare.

Throughout the unit, the delivery should be focused on aspects of health and safety (eg size, toxicity and disease transmission) incorporated when working with dangerous animal species and those subject to Dangerous Wild Animals Act 1976. It is anticipated that on completion of the unit, learners could progress to more advanced study in the subject.

Learning outcomes

In this unit, learners will be able to

1. Understand the sourcing and legislation of exotic animal species
2. Understand the health, welfare and reproductive requirements of exotic animal species
3. Prepare accommodation and feeding regimes for exotic animal species
4. Handle, restrain and transport exotic animal species

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

Learners should cover a minimum of two non-native species from the range:

- Invertebrates
- Amphibians
- Fish
- Reptiles
- Birds
- Mammals

Learning outcome:

1. Understand sourcing and legislation of exotic animal species

Topics

1.1 Ethical sourcing of exotic animal species

1.2 Legislation associated with keeping exotic animal species in captivity

1.3 The impact of the five animal 'needs' on exotic animal welfare

This outcome 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. Relevant legislation will be summarised (CITES – Convention on International Trade in Endangered Species, Dangerous Wild Animals Act 1976, Animal Welfare Act 2006).

Topic 1.1

Learners need to develop an understanding of the potential sources and ethics of exotic animals to include:

- 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)
- Other sources (eg Captive farmed (CF), Long term Captive(LTC), Wild Caught (WC), Captive Bred (CB)) and impact on exemplar species and the global trade

Topic 1.2

Learners should have an appreciation of the relevant legislation associated with keeping exotic animal species:

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- Dangerous Wild Animals Act 1976
- CITES

- COTES
- Secretary of States Standards of Modern Zoo Practice
- Pet Animals Act 1981.

Topic 1.3

The Five Animal Welfare Needs should be discussed and the impact on exotic animals from failure to fulfil these needs. The relative needs of animals which are ectothermic and endothermic (temperature, light, humidity, ventilation, design):

- A suitable environment
- A suitable diet
- To be housed with or apart from other animals
- To exhibit normal behaviour
- To be protected from pain, injury, suffering and disease.

Learning outcome:

2. Understand the health, welfare and reproductive requirements of exotic animal species

Topics

2.1 The causes of ill health and consequences of poor welfare in exotic animal species from the range

2.2 How disease symptoms in exotic animal species are recorded, monitored and treated

2.3 Explore the reproductive strategies of exotic animal species

In this outcome the learner will be able to apply their knowledge of welfare gained in outcome 1 to specific exotic species. Instances of ill health (eg 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.

Topic 2.1

The learner will identify the causes of ill health and consequences of poor welfare in chosen exotic animal species. The learner will understand the role of pathogens and be able to identify symptoms and appropriate treatments:

- Bacteria, viruses, fungi and parasites
- Examples of diseases caused by each pathogen (eg chytrid fungus, pneumonia, necrotic stomatitis and dermatitis, endo parasites and ecto parasites, psittacosis)
- Non-pathogenic causes of ill health (eg metabolic bone disease, dysecdysis, dystocia, malocclusion, diseases caused by poor water quality)
- Scenarios that lead to poor welfare in exotic animal species, how these can be rectified and prevented
- An awareness of the impact of zoonoses, zooanthroponosis (eg salmonellosis, fish TB, aspergillosis).

Topic 2.2

Learners need to recognise signs of health in context of:

- Body condition and appearance
- Behaviour, locomotion, posture, feeding, drinking, urination/ defecation and weight change.

The learner will have an understanding of how to assess disease symptoms and identify appropriate treatments for chosen exotic animal species, to incorporate:

- Recognising and reporting symptoms

- Identifying appropriate treatments
- Monitoring
- Recording.

Learners should also understand the measures that can be used to prevent and control disease (biosecurity) in exotic animal species to include quarantine and isolation.

Topic 2.3

The learner will explore the reproductive strategies of exotic animal species, understand correct terminology and conditions needed for breeding for species from the range:

- Oviparous, viviparous, ovo-viviparous
- Parental care
- Environmental requirements.

Learning outcome:

3. Prepare accommodation and feeding regimes for exotic animal species

Topics

3.1 Prepare appropriate accommodation to incorporate natural habitat features (clinical, artificial, natural)

3.2 Feeding requirements

3.3 Prepare and feed typical daily diets

In this outcome, the learner will be able to apply knowledge and understanding of the requirements of exotic species to ensure housing, accommodation and environment meet the needs of the chosen exotic species (to consider space, substrates, temperature, humidity, light intensity and stocking density). Additionally, appropriate feedstuffs will be identified, selected, prepared and presented in suitable proportions for the chosen exotic species at time intervals corresponding to their natural foraging routines. This will include live, dried, fresh and frozen sources plus supplements.

Topic 3.1

Learners will be able to identify and assemble appropriate materials and equipment into an enclosure to create a suitable habitat for a nominated exotic animal species:

- Furnishings
- Substrates
- Vegetation
- Water and feeding equipment
- Heating and lighting
- Humidity and ventilation.

Learners should have an appreciation for the maintenance requirements for exotic animal species from different habitats and creating and maintaining an appropriate micro climate:

- Terrestrial
- Fossorial
- Arboreal
- Aquatic
- Semi aquatic.

Topic 3.2

Learners should understand species-specific feeding requirements, including:

- Creating a balanced diet
- Choosing appropriate feeds (ingredients, substitutes, supplements)
- Food preparation
- Food presentation
- Recording feeding
- Food storage
- Waste disposal.

Topic 3.3

Learners will be able to select, prepare and feed appropriate daily diets to a range of exotic animal species:

- Feeding groups (eg hunting, scavenging, foraging)
- How feeding strategies can meet requirements (eg frequency and amounts)
- Feeding methods to incorporate natural habitats (eg nocturnal, diurnal, crepuscular).

Learning outcome:

4. Handle, restrain and transport exotic animal species

Topics

4.1 Handle and restrain exotic animal species
4.2 Moving exotic animals species incorporating relevant transport legislation

In this outcome, 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, bags, restraining tubes, tubs and containers, nets, 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

Topic 4.1

The learner will use appropriate Personal Protective Equipment (PPE) and restraint equipment for selected exotic animal species and correctly demonstrate its use to safely and effectively restrain them.

PPE and restraint equipment may include:

- Gloves and gauntlets
- Eye protection
- Facemasks
- Protective clothing footwear
- Collars and leads
- Crush cage/ bags
- Graspers/nooses
- Towels/blankets
- Restraining tubes
- Padded tongs
- Nets
- Boxes
- Snake hooks.

When handling animals, learners need to appreciate safety considerations:

- Avoidance of bites, scratches, stings
- Toxic secretions
- Allergens
- Lashings from tails
- An awareness of venom protocols and policy (haemotoxins/neurotoxins)
- Avoidance of zoonotic disease.

Topic 4.2

When transporting exotic animal species, learners should be able to:

- Recognise suitable containers to transport exotic species between locations.
- investigate current relevant statutory regulations
- Appreciate the importance of preparing appropriate paperwork and records required for transportation.

The learner should understand the main legislative statutes, interpret their application to the transportation of exotic species. This should include:

- CITES
- The Welfare of Animals (Transport) Order 2006
- IATA Regulations
- COTES 2009
- DEFRA.

Guidance for delivery

This unit is designed to provide the learner with principles and underpinning knowledge of factors that contribute to the health and welfare of a range of exotic species. It is anticipated that this could be applied to exotic animal species in retail outlets, specialist collections or hobbyists who keep animals in a domestic environment. Centres are encouraged to introduce employers and specific professionals from industry to provide interesting and relevant information to the learner.

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 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 in order to add depth to the learner experience.

It is important that the specific requirements of exotic animal species are considered in terms of housing and that reference is made to the range of habitats which form their natural range. Signs of normal health will be reviewed in context of body condition, behaviour, locomotion, posture, feeding, drinking, excretion/defecation and weight change.

Unit 311 Pet Store Design and Management

UAN:	J/507/7133
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to gain an understanding of how pet stores are designed, managed and find out the husbandry requirements of animals being sold. The learner will be able to identify both livestock and non-livestock products and their sources, methods of stock control and the ethics surrounding this. Learners will also cover marketing of pet stores and all relevant legislations. Learners will gain an understanding of good customer service and be able to deal with a range of store related scenarios in preparation for future employment.

Learning outcomes

In this unit, learners will be able to

1. Understand how to design a pet store
2. Understand how to apply for a pet shop licence and relevant legislation
3. Understand the sources of livestock and non-livestock products found in a pet store
4. Understand the husbandry requirements of animals sold in pet stores
5. Understand the importance of marketing for a pet store
6. Understand customer service skills applicable to the retail industry in the wider context.

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved. A realistic range of animals needs to be covered which would typically be sold in a pet store. This can include small mammals, aquatic animals, exotics and birds.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

Learning outcome:

1. Understand how to design a pet store

Topics

1.1 Suitable layout and design for a pet store

1.2 Needs of the livestock in the pet store in regard to store layout

In this outcome, the learner is required to know what types of layouts can be used in pet stores and how this affects livestock, and non-livestock products as well as profitability. The aim is for learners to have an understanding of what is required to create a successful business.

Topic 11

Learners need to describe a suitable store layout (eg grid, spine, free-flow and loop), to include:

- Store location
- 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.

Topic 1.2

Learners need to recognise the requirements of the livestock in the pet store in regard to store layout to include:

- Safe access for maintenance (eg cleaning, water and electrical supplies)
- Viewing by the public
- Location of housing (eg away from noise, sunlight, crowded areas)
- Security (eg locking systems, CCTV, constant supervision).

Learning outcome:

2. Understand how to apply for a pet shop licence and relevant legislation

Topics

2.1 How to apply for a pet shop licence

2.2 Standards required to maintain a licence and relevant legislations

In this outcome learners will understand how to apply for a pet store licence and know what standards are required to maintain the licence. The needs of livestock will be included as part of this outcome and the legislation which governs this.

Topic 2.1

Learners need to know how to apply for a pet shop licence, to include:

- On-line application forms
- Cost
- Difference between local authorities.

Topic 2.2

Learners need have an appreciation of what standards need to be met to maintain a licence and the evidence required to include:

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- Animal Welfare Act 2006
- Pet Animals Act 1951

Learners need to describe the health and safety measures required as part of the licensing conditions, which may include:

- Disease prevention (eg cleaning routines, Personal Protective Equipment (PPE)
- Correct waste disposal)
- Safe manual handling (eg Personal protective equipment (PPE), lifting procedures)
- Licences for dangerous species
- Accommodation for dangerous species (eg enclosures within enclosures, locking systems, staff training)
- Fire safety and procedures (eg staff training, required equipment, evacuation plan).

Learning outcome:

3. Understand the sources of livestock and non-livestock products found in a pet store

Topics

3.1 The sources of livestock and non-livestock products

3.2 Ethics of sourcing livestock

3.3 The methods of stock control used by pet stores

This outcome focuses on the products which are sold in the pet store, and where they originated from. The learner should be able 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 should to be evaluated. Finally, the topic of stock control will be covered, including livestock control methods.

Topic 3.1

Learners need to be able to identify the sources of products, to include:

- Livestock (eg specialist breeders, hobbyists, shows, small pet stores, superstores, wholesalers, importers, farms)
- Non-livestock (eg wholesalers, suppliers, superstores, importers).

Non-livestock products include:

- Bedding (eg dog beds, cat beds, rodent, reptile)

- Substrates (eg sawdust, shredded paper, cat litter, sand paper)
- Handling equipment (eg leads and collars, harnesses, muzzles)
- Books, food, treats, toys (eg boredom breakers, gnawing blocks, mirrors)
- Housing (eg rodent houses, hutches, vivaria, glass tanks, wire cages)
- Fish equipment (eg tanks, filters, gravel, enrichments).

Topic 3.2

Learners need to understand the ethics of sourcing livestock comparing the advantages and disadvantages of using UK based suppliers over using international suppliers, which may include:

- Carbon footprint
- Welfare eg capture techniques, transport, accommodation
- Cost
- Quality of stock
- Captive bred/ wild caught.

Topic 3.3

Learners need to understand the methods of stock control to include:

- Monitoring stock eg stock taking, stock rotation, meeting demand
- Monitoring livestock eg animal temperament, re-homing older animals, animal adoption, surplus to demand.

Learning outcome:

4. Understand the husbandry requirements of animals sold in pet stores

Topics

4.1 Housing requirements of animals being sold in pet stores

4.2 Husbandry regime for animals being kept in pet stores

In this outcome the learner is required to understand 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 understand the suitable housing requirements for these animals. Learners will understand the relevant health and safety measures involved when dealing with animals being sold in pet stores.

Topic 4.1

Learners need to understand the housing requirements of animals being sold in pet stores to include:

- Type of accommodation
- Material used for housing
- Substrate (eg wood shavings, hay, shredded paper, sand, bark)
- Size requirement of species
- Feeding provision, water provision
- Enrichment (eg toys, company, exercise)
- Heating, lighting (eg nocturnal/diurnal species).

Topic 4.2

Learners need to explain the hhusbandry regime for animals being kept in pet stores, to include:

- Feeding (time of day, how food is supplied eg bowls, scatter fed)
- Watering

- Cleaning (frequency, equipment required)
- Exercise
- Handling
- Regular health checking
- Record keeping.

Learning outcome:

5. Understand the importance of marketing for a pet store

Topics

5.1 Methods of marketing used by pet stores

5.2 Legislation relating to the marketing of pet stores

In this outcome, the focus is on the marketing surrounding pet stores. A number of marketing 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.

Topic 5.1

Learners need to know the methods of marketing, and their advantages and disadvantages, to include:

- Leaflets
- Posters
- Media (eg internet, television, newspapers, magazines)
- Food packaging, target market (eg local, national, pet owners)
- Time of marketing (eg seasonal, all year, bank holidays, weekends)
- Offers (eg buy one get one free, two for one)
- Company logo and slogans.

Topic 5.2

Learners need to appreciate the reasons for legislation (compliance, requirements, punishments, responsibilities) to include:

- The Trade Descriptions Act 1968
- The Sale of Goods Act 1968 (as amended 1979 & 1994)
- Weights and Measures Act 1985
- Animal Welfare Act 2006
- Health and Safety at Work Act 1974.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

Learners may look at other legislation appropriate to their selected species.

Learning outcome:

6. Understand customer service skills applicable to the retail industry in the wider context

Topics

6.1 Customer service skills

This outcome will focus on customer service skills. Learners will gain an understanding of how to deal with complaints and different situation within the retail industry.

Topic 6.1

Learners need to be able to differentiate between 'good' and 'poor' customer service skills.

Learners need to have an appreciation of how to deal with difficult situations and work within a team.

Guidance for delivery

This unit is designed to provide the learner with sound knowledge and skills required to understand suitable store layouts and successful management and care of the animals within it. The unit must cover pet stores which sell both livestock, and non-livestock products. Relevant legislation and customer services are to be covered.

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. This will link with industry links and possible career choices. Skills will be transferable for other industries as well as those in the retail sector.

In Outcome 1 could be delivered through visits to different types/sizes of store, and or theoretical sessions. The aim is for learners to have an understanding of what is required to create a successful business.

The delivery of outcome 3 would benefit from visits to pet store establishments and talks/discussions with personnel involved with sourcing/acquiring stock. Learners can debate the ethics of sourcing livestock and understand the pros and cons of each source.

Outcome 4 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.

Delivery of outcome 5 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.

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.

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.

Unit 312 Animal Training

UAN:	Y/507/7136
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners 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

In this unit, learners will be able to

1. Assess animal behaviour
2. Apply training aids within a training programme
3. Training animals

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

All of the learning outcomes are closely linked and could be delivered in conjunction with one another.

Range of species:

Companion animals (dogs or cats) or small mammals (eg rabbits, rodents) or large mammals (eg goats, sheep), birds or zoo animals.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

Learning outcome:

1. Assess animal behaviour

Topics

1.1 Behavioural assessment on animals

1.2 Design a training programme

In this outcome, the learner will be required to assess animal behaviour and based on this assessment and knowledge of learning theory, design a suitable training programme.

Topic 1.1

Learners need to have an understanding of learning theory, to include:

- Stimulus-response learning (habituation and sensitisation),
- Associative learning (classical and operant conditioning),
- Higher learning (social/observational, latent and insight learning, cognition).

Learners will need to carry out a behavioural assessment on a selected animal. The learner will need to include:

- Type of behavioural assessment (eg questionnaire versus observation-based tests)
- Consideration of species/breed requirements for training
- Designing a behaviour assessment and recording results (eg using scales for ease of replication).

Learner will need to understand the considerations for creating a training programme, which include:

- Species
- Breed
- History
- Temperament
- Health
- Behaviour.

Topic 1.2

Learners will need to design a training programme based on their behavioural assessment of their chosen animal, to include:

- End goal
- Training method (hands off versus hands on, luring/baiting, capturing, shaping)

- Duration
- Frequency of training
- Reinforcement method (eg positive reinforcement, food, social, praise rewards – the Premack principle)
- Reinforcement schedule (how often to reward)
- Shaping plan
- Equipment (eg clickers, transport boxes, whistles, equipment will depend on planned training and species).

Learning outcome:

2. Apply training aids within a training programme

Topics

2.1 Training aids that can be used in training programmes for animals

2.2 The effectiveness of different animal training aids.

This outcome requires learners to demonstrate knowledge of training aids that can be used in training animals, their correct use and effectiveness.

Topic 2.1

Delivery of this outcome could be supported through practical demonstration, video, internet etc.

Learners will need to select training aids that are appropriate to the animal, these may include:

- Leads
- Collars
- Harnesses
- Muzzles
- Rewards (eg food, toys, praise)
- Chemicals (eg artificial pheromones)
- Whistles
- Clickers
- Targets
- Stations.

Learners will need to use the appropriate choice of training aids for the animal, considering the following:

- Species
- Breed
- Age
- Sex
- Appropriate application
- Appropriate use (when to use and when not to use, considerations for animal health and behaviour).

Topic 2.2

Learners will need to evaluate the effectiveness of the selected training equipment.

Learning outcome:

3. Training animals

Topics

3.1 Implement animal training programmes to achieve specific goals

3.2 Review the progress of an animal and modify training programmes accordingly

3.3 Impacts of stress on animal learning and training

In this outcome, the learner will be required to implement a training programme to meet a specific goal and regularly review progress and modify as needed. 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.

They will also be required to demonstrate knowledge of the impacts of stress on animal learning and training including consideration of commonly used, potentially stressful training techniques and equipment.

Topic 3.1

The learner will need to implement the animal training programmes that they designed in learning outcome one. It may include the following animal training techniques:

- Baiting /luring
- Capturing
- Shaping
- Bridging
- Desensitisation.

They will also need to cover counter-conditioning reinforcement schedules, which may include:

- Continuous
- Variable
- Extinction.

The training programme will need to have specific goals, that are appropriate for the animal, which may include:

- House training (eg urination and defecation, silence and jumping up)
- Social referencing (i.e. socialisation and habituation)
- Trick training (eg fetch, jump, balance)
- Obedience training (eg lead work, sit, stay, down, leave and come),
- Agility (eg flyball, dog agility courses)
- Working animals (eg following scents, hunting, retrieving, intimidation eg bark on command)
- Husbandry (eg stationing, box training, limb presentation).

Topic 3.2

Learners need to monitor and record the progress of the training programme, this may include:

- Paper, video and peer review
- Setting goals (shaping plan),
- Reviewing equipment,
- Modify training based on on-going evaluation to improve results and/or further training,

- Common training problems (eg inadvertent reinforcement, poor progress).

This should include an evaluation of the effectiveness of the training programme.

Topic 3.3

Learners will need to understand the following:

- Definition and signs of stress
- Physiological effects of stress
- Effects of stress on memory and learning
- Explanation of and problems with using flooding as a training technique
- Results of flooding to include learned helplessness and chronic stress
- Use of potentially stress-inducing equipment (eg shock collars, whips, water sprays, prong collars).

Guidance for delivery

This unit is designed to provide the learner with a sound knowledge and understanding of animal behaviour, learning and training. The learner should also be able to demonstrate the ability to assess animals, plan training and implement, reviewing and modifying an animal training programme. The unit should cover a range of species appropriate to the study of animal training.

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.

Unit 313 Aquatics Welfare and Breed Development

UAN:	K/507/7139
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to understand the general care and management of a variety of aquatic species commonly kept in captivity. The unit includes the specific nutrition, accommodation, health and breeding needs of aquatic species. The unit will provide learners with an awareness of different aquatic establishments and an understanding of the natural habitats and physical adaptations of aquatic species to suit their environments.

Throughout the unit, the delivery should be focused on aspects of health and safety (eg working with electricity and water, toxicity and disease transmission) incorporated when working with aquatic species.

Learning outcomes

In this unit, learners will be able to

1. Understand how to develop and maintain aquatic systems
2. Understand commonly kept fish species and aspects of their biology
3. Analyse foods and feeding techniques for aquatic species
4. Understand common fish diseases and causes of ill health
5. Explore different aquatic systems and establishments and the ethics surrounding sourcing aquatic species

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

The following is a guided list of the legislation that applies in the Animal Care sector. For purposes of assessment, there is no requirement for detail; however learners should be able to summarise the aims and purpose of the legislation, linking to other learning outcomes within this unit. Centres should be up to date with legislation, policies and codes of practice used in the taught content.

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- Zoo Licensing Act (1981)
- Animal Welfare Act (2006)
- CITES
- Import of Live Fish Act (1980)
- Pet Animals Act (1951)
- Dangerous animals.

The learner should select commonly kept aquatic species from the range which may include:

- Tetras, rasboras and danios
- Cichlids
- Anabantids
- Livebearers
- Catfish
- Goldfish, koi carp
- Cyprinids
- Tangs
- Damselfish
- Butterflyfish
- Angelfish
- Marine invertebrates, soft corals.

The learner should become familiar with aquatic set ups from the following environments:

- Temperate freshwater
- Tropical freshwater
- Tropical marine
- Brackish.

Learning outcome:

1. Understand how to develop and maintain aquatic systems

Topics

1.1 Equipment requirements for freshwater, brackish and marine aquariums
1.2 The Importance of water quality and filtration (nitrification process)
1.3 Suitability of locations for an aquarium
1.4 Health and safety requirements of a given aquarium
1.5 How a given aquarium system complies with relevant current legislation

In this outcome, learners will become familiar with the different types of equipment available for use in aquaria and understand how to correctly set up and maintain aquaria. 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. Learners should be aware of how legislation affects different aquaria and aquatic establishments.

Topic 1.1

Learners need to recognise the equipment requirements for freshwater, brackish and marine aquaria which includes:

- Lighting (LED's,T-5's and T8's, metal halide, light spectrum)
- Filter types (under gravel, foam, power, mechanical, chemical, biological, UV steriliser, foam fractionation, activated charcoal/carbon and ozone)
- Substrate choice (gravel, sand, no substrate)
- Heater and thermostat
- Enrichment and aqua-scaping (live plants, rocks, woods and artificial decoration).

Topic 1.2

Learners will need to develop an understanding of the Importance of water quality and filtration (nitrification process) is essential for a successful aquarium, to include:

- Water quality
- Filtration
- The nitrification process (ammonia, nitrite and nitrate)
- Water changes.

Topic 1.3

The learner will understand the importance of the aquarium location in various setting, which may include:

- Aquatic establishments
- Home
- Workplace.

The learner needs to consider the following when siting an aquarium:

- Proximity to power
- Proximity to water
- Proximity to light/windows
- Waste disposal
- Floor loading
- Passing traffic

- Air quality
- Noise.

Topic 1.4

The learner need to understand the importance of the following health and safety requirements of a given aquarium:

- Circuit breakers
- Damaged equipment
- Hygiene
- Health and Safety at Work Act (1974).

Topic 1.5

The learner needs to evaluate how a given aquarium system complies with relevant current legislation, to consider the following:

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- Zoo Licensing Act (1981)
- Animal Welfare Act (2006)
- CITES
- Import of Live Fish Act (1980)
- Pet Animals Act (1951)
- Dangerous animals eg piranhas, stingrays, corals and other venomous species.

Learning outcome:

2. Understand commonly kept fish species and aspects of their biology

Topics

2.1 Develop an understanding of fish classification and identify commonly kept species
2.2 Identify the functions of the physical features of given fish species
2.3 Investigate different reproductive strategies of fish species
2.4 Develop an appreciation of natural habitats and fish adaptations

In this outcome, the learner will develop an understanding of fish classification, the associated internal and external physiology of a fish and physical adaptations. The learner will also investigate a range of contrasting reproductive strategies employed by fish species. The learner will develop an appreciation of the different natural habitats aquatic species inhabit in the wild and related physical adaptations to suit their natural environments.

Topic 2.1

The learner will develop an understanding of fish species classification system and identify significant physical features of the following:

- Chrondrichthyes
- Agnatha
- Osteichthyes

The learner will identify commonly kept fish species from the range.

Topic 2.2

The learner will identify the functions of physical features of given fish species, to include:

- Fins (dorsal, anal, caudal, adipose, pelvic and pectoral)
- Lateral line
- Gills and lungs
- Eyes
- Mouth and dentition
- Scales and mucous
- Swim bladder
- Heart
- Digestive tract (stomach, lack of stomach, anus)
- Kidney, liver, gall bladder
- Gonads and genital opening
- Male and female reproductive organs.

Topic 2.3

The learner should evaluate the benefits of different reproductive strategies and parental care of different fish species, to include:

- Egg scattering
- Egg depositors
- Mouth brooders
- Substrate brooding
- Nest building
- Live bearing
- Sequential hermaphrodites.

Topic 2.4

The learner will need to develop an appreciation of natural habitats and fish adaptations by considering the following:

- Natural habitats (open ocean, mangrove swamp, flooded forest, estuary, coral reef, rock pool, river, lake, natural pond)
- Adaptations (eg aestivation, labyrinth fish and lung fish).

Learning outcome:

3. Analyse foods and feeding techniques for aquatic species

Topics

3.1 Feeding strategies of given fish species

3.2 Methods of presenting foods to fish in an aquarium

3.3 How incorrect feeding of fish can impact on water quality

In this outcome, the learner will become familiar with the different types of food available for aquatic species and the methods of feeding fish. Learners need to relate the digestive system of fish (stomach size), to frequency of feeding. Emphasis could be placed on feed/fast strategy normally used with fish, and its effects on waste products. This can be linked to physical adaptations and mouth positions in fish to aid their feeding strategy.

There is a direct link with Learning outcome 4 (causes of fish disease) and Outcome 2 (internal structure of digestive tract).

Topic 3.1

The learner will need to understand various feeding strategies of given fish species, to include:

- Carnivores, herbivores, omnivores, insectivores, browsers
- Surface feeders, mid water feeders and substrate feeders
- Filter feeders.

Topic 3.2

The learner will be able to identify and evaluate appropriate methods of presenting foods to fish in an aquarium, to include:

Methods:

- Scatter feeding
- Automatic feeding
- Hand feeding
- Drip feeding
- Frequency of feeding.

Food types:

- Flake food
- Pellets
- Live food
- Frozen food
- Fresh food
- Freeze dried.

To incorporate nutritional constituents, water soluble vitamins and colour enhancers as necessary to the species.

Topic 3.3

The learner will need to explain how incorrect feeding of fish can impact water quality in an aquarium by considering the following:

Incorrect feeding:

- Overfeeding
- Starvation
- Incorrect food type
- Bite size.

Effect of overfeeding on water quality:

- Oxygen level
- Ammonia level
- pH.

Learning outcome:

4. Understand common fish diseases and causes of ill health

Topics

4.1 Identify common causes of disease in fish

4.2 Identify records which should be kept for a given aquarium/establishment

In this outcome, learners should be able to recognise and report on common pathogenic and husbandry induced diseases of fish. The learner will investigate the life cycles of common disease organisms and identify suitable treatments. There are links to Outcome 1 and 3 as water quality is common to both outcomes. Practical activities such as fish health observations and skin scrapes may be beneficial.

Topic 4.1

The learner will be able to identify and treat common causes of disease in fish and be able to differentiate between husbandry (water quality) and pathogenic induced causes, to include:

Water quality:

- pH
- Water hardness
- Temperature
- Ammonia
- Nitrite / nitrate
- Stresses (eg aggression/breeding)

Pathogens:

- Bacteria
- Protozoa
- Fungi
- Nematode
- Digenea, monogenea
- Common diseases such as costia, tricodina, ichthyophthirius and camellanus.

Learners to consider other factors such as stress (aggression, breeding) and desirable and undesirable deformities.

Topic 4.2

The learner will need to understand the requirement for appropriate records which should be kept

for a given aquarium/establishment which may include:

- Species and numbers
- Age
- Sex
- Births / deaths
- Arrival date / removal date
- Destination
- Source of new livestock
- Diseases / treatments
- Water change date
- Water test readings (eg temperature, date, nitrite, nitrate, ammonia, pH)

Learning outcome:

5. Explore different aquatic systems and establishments and the ethics surrounding sourcing aquatic species

Topics

5.1 Different types of aquatic establishments and aquarium systems

5.2 Ethics of sourcing livestock

In this outcome, learners will look at different types aquatic establishments and how they source their livestock. Learners will be made aware of the different sources of obtaining commonly kept fish species and discuss the ethics behind each method – this will include capture methods of wild species, captive breeding, and how species are transported. Learners can learn through research and debate. Learners will be in a position to question for themselves ethics behind keeping aquatic species in captivity.

Topic 5.1

The learner will have an appreciation of the differences between types of private and public aquatic establishments, which may include :

- Public aquaria
- Zoos
- Pet shops
- Home aquaria.

Topic 5.2

The learner will understand the eethical considerations of sourcing livestockk for different establishments, to include the following:

- Wholesale
- Importers
- Farms
- Specialist breeders
- Hobbyists.

Guidance for delivery

This unit is designed to provide the learner with the knowledge and understanding required to improve the welfare of aquatic species commonly kept in captivity. Whilst this unit could be delivered entirely formally, it is expected that practical activities such as fish health observations, skin scrapes and dissections would enhance delivery. Guest speakers from industry, and visits to aquatic establishments will provide interest, experience and add depth to the learner knowledge.

Some aspects of the learning outcomes could be acquired from industry placements, learners could be encouraged to add their experiences to the delivery. Learners must be given the opportunity to deal with a range of aquatic species in different situations which reflects current industry practice. 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. Safe working practice should be emphasized throughout the unit.

Unit 314 Avian Health and Husbandry

UAN:	F/507/7146
Level:	3
GLH:	60

What is this unit about?

This unit is aimed to provide learners with knowledge of a variety of avian species and their general care and management. Learners will be taught about a range of species kept in a variety of situations. The unit includes feeding, accommodation, health, welfare and breeding and would ideally include practical experience with a variety of avian species.

The purpose of this unit is for learners to develop knowledge and practical skills in the general care and management of avian species commonly kept in captivity to include:

- Trained
- Pets
- Zoological collections.

This unit allows the learner to explore:

- Accommodation
- Diet
- Health and welfare
- Handling and restraint techniques
- Anatomy and biology
- Breeding.

Learning outcomes

In this unit, learners will be able to

1. Evaluating existing methods of husbandry for avian species
2. Understand the health and welfare requirements of avian species
3. Handle, restrain and transport avian species
4. Understand avian anatomy and reproductive physiology

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the bird by recognising and minimising stress.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

Learners should cover a minimum of 2 of avian species from the following range:

- Land birds
- Flightless birds
- Waterfowl
- Parrots
- Corvids
- Songbirds
- Raptors
- Ratites
- Penguin.

Learning outcome:

1. Evaluating existing methods of husbandry for avian species

Topics

1.1 Design and evaluate accommodation for avian species
1.2 Provide essential features of nutrition for avian species
1.3 Create an enrichment programme for an avian species

Learners will be required to evaluate housing and diet for a range of avian species as described in the content. This is to include describing suitable accommodation types for individual species, preparing and presenting food and designing enrichment

Topic 1.1

Learners will be able to differentiate between accommodation types which may include (dependant on species chosen from the range provided above):

- Cages (eg size, height, location, substrate, indoor, outdoor)
- Flights
- Aviaries
- Weathering yard
- Free loft
- Mews.

Topic 1.2

Learners will need to describe different feeding and watering techniques and diets for avian species, to include:

- Equipment eg automatic feeders, seed feeder, bottles
- Feeding techniques eg scatter feeding, presentation, on the glove, live food
- Dietary types eg soft bills, seed eaters, carnivores, insectivores, nectar feeders
- Supplementation.

Learners need to have an appreciation of the differences in diet and the effects of poor diet for avian species.

Topic 1.3

Learners will need to describe the different approaches to enrichment for avian species to include:

- Naturalistic
- Mechanical
- Nutritional.

Learning outcome:

2. Understand the health and welfare requirements of avian species

Topics

2.1 The five animal needs and how they relate to avian species

2.2 Causes of disease in avian species

2.3 Disease monitoring, treatment, prevention and control

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 how the five animal needs relate to avian species.

This learning outcome links to the **'Animal Health'** unit.

Topic 2.1

Learners will be able to understand how the five animal needs relate to keeping avian species, which must include:

- Somewhere suitable to live
- A proper diet, including fresh water
- The ability to express normal behaviour
- Need to be housed with, or apart from other animals
- Protection from, and treatment of, illness and injury.

Topic 2.2

Learners will need to describe the signs of health and disease in avian species, to include:

- Eyes
- Beak
- Skin/ feather condition including visual parasites
- Movement
- Flight

- Behaviour
- Weight
- Feet, claws and nails
- Cloaca.

Learners will also need to recognise pathogenic signs to include:

- Bacteria
- Viruses
- Fungi
- Endo-parasite and ecto-parasites.

Learners need to understand husbandry induced causes of poor health, which may include:

- Malnutrition
- Poisoning
- Bumble foot
- Dystocia
- Feather plucking.

Learners will also need to have an appreciation of avian specific notifiable, zoonotic diseases and anthroponoses. This will link to Unit 303 Animal Health.

Topic 2.3

Learners will understand the medical needs of avian species, to include:

- Types of medication
- Routes of administration
- Dosage
- Monitoring an animal for signs of improvement
- Prevention
- Quarantine procedures

Learning outcome:

3. Handle, restrain and transport avian species

Topics

3.1 Handle and restrain avian species

3.2 Use of handling and restraint equipment for avian species according to Animal Welfare and Health and Safety policy

3.3 Methods of transport for avian species

In this outcome, 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.

Topic 3.1
Learners will understand how to ensure safety of the bird and handler when handling avian species, to cover:

- Safety for self, others and the bird
- Minimising stress
- Minimising disruption to other birds and animals
- Health checking
- Dangerous birds (eg equipment, assistance, Personal Protective Equipment (PPE)).

Topic 3.2
Learners will be able to identify and demonstrate correct use of handling equipment appropriate to a variety of avian species, which may include:

- Net
- Towel
- Bag
- Gloves
- Falconry equipment (If chosen from the range).

Topic 3.3
Learners will understand the transport requirements for avian species to include:

- Methods of appropriate transport for avian species
- Equipment (box, cage carrier)
- Length of journey
- Minimising stress (noise, handling, distance, temperature, ventilation, lighting)
- Journey plan
- Welfare considerations.

Learning outcome:

4. Understand avian anatomy and reproductive physiology

Topics

4.1 Avian anatomy and physiology
4.2 Create a breeding plan for avian species

In this outcome, the learners are required to describe anatomy and physiology of avian species and breeding plans

To identify a suitable breeding plan, the learners' must research a bird of their choice and plan for breeding.

Topic 4.1
This topic links '**Biological systems of animals unit**' but focuses on avian species. Learners should use the knowledge from that unit and apply it to the content of this learning outcome

Learners will need to have an understanding of the following anatomical systems:

- Skeletal
- Muscular
- Digestive
- Respiratory
- Excretory
- Reproductive.

Topic 4.2

Learners will need to create their own breeding plan which will include detail on the following:

- Breeding triggers eg environment, light, temperature, season, hormonal activity)
- Pairing birds
- Introduction methods
- Timings
- Expected outcomes (eg eggs laid, timings, dates, hatch dates, fledging dates, and mortality rates).

Guidance for delivery

This unit is aimed to provide learners with knowledge of a variety of avian species and their general care and management. Learners will be taught about a range of species kept in a variety of situations.

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 avian species in different situations which reflects current industry practice.

Unit 315 Animal Nursing

UAN:	L/507/7148
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners 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

In this unit, learners will be able to

1. Understand veterinary terminology and common conditions
2. Understand veterinary practice procedures
3. Care for an in-patient
4. Recognise procedures and equipment within a veterinary environment

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners are guided towards safe working practices and maintaining the welfare of the animals by recognising and minimising stress.

The following is a guided list of the legislation that applies in the Animal Care sector. For purposes of assessment, there is no requirement for detail; however, learners should be able to summarise the aims and purpose of the legislation, linking to other learning outcomes within this unit. Centres should be up to date with legislation, policies and codes of practice used in the taught content.

The unit should cover a range of species as appropriate to the area of study:

- Companion (dog or cat) and small mammal (rabbit)

Learning outcome:

1. Understand veterinary terminology and common conditions

Topics

1.1 Recognise associated veterinary terminology
1.2 Common medical conditions
1.3 Common surgical conditions
1.4 Infectious diseases

This outcome requires the learner to use the different veterinary terminology associated with and uses of veterinary specific equipment. The learner should be able to identify common medical and surgical conditions as well as common infectious diseases affecting animals within the range.

Topic 1.1

Learners will be able to use veterinary terminology in context, to include:

- Anatomical directional terms to include: caudal, cranial, ventral, dorsal, palmar, plantar, distal, proximal, rostral, medial, lateral
- Common prefixes and suffixes eg – dys,-itis, -osis, -otomy, , -ectomy
- Common veterinary abbreviations eg RTC, TPR, NAD, BAR

Topic 1.2

Learners will have a basic understanding of common medical conditions which may include:

- Arthritis
- Colitis
- Pancreatitis
- Chronic renal failure
- Urinary tract disease (urolithasis,cystitis,)
- Pyometra
- Diabetes mellitus
- Congestive heart failure

Topic 1.3

Learners will have a basic understanding of common surgical conditions, to include:

- Abscesses
- Wounds
- Fractures
- Foreign bodies
- Pyometra.

Topic 1.4

In this topic, learners will have a basic understanding of common infectious diseases. Learners need to identify the signs, symptoms and treatment of infectious diseases, which may include;

- Canine distemper
- Canine parvo-virus
- Leptospirosis
- Canine hepatitis
- Para-influenza
- Kennel cough
- Feline panleucopaenia (feline infectious enteritis)
- Feline upper respiratory disease (cat flu)
- Feline leukaemia virus
- Myxomatosis
- Viral Haemorrhagic Disease

Learners may choose to explore other infectious diseases.

Learning outcome:

2. Understand veterinary practice procedures

Topics

2.1 Roles of staff in a veterinary practice

2.2 The importance of communication when dealing with staff and clients

2.3 Legislation for veterinary practices

This outcome relates to staff within a veterinary practice and requires the learner to be aware of the different staff within the practice and their limitations. It also covers 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. They are also required to have an understanding of relevant legislation especially the Veterinary Surgeons Act – Schedule 3 procedures and the impact this has within the veterinary practice. 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.

Topic 2.1

Learners are to identify the job roles and responsibilities of the following staff members:

- Receptionist
- Student veterinary nurse
- Qualified Veterinary Nurse (registered and non-registered)
- Head Veterinary Nurse
- Veterinary Surgeon
- Practice manager
- Animal nursing assistants
- Lay people.

Topic 2.2

Learners are to identify the different method of communication, to include:

- Telephone
- Face to face
- Email
- Fax
- Social media and text message
- Letter
- Body language.

Delivery of this topic could be supported through discussion and role plays demonstrating how to deal with different client types and scenarios:

Different client situations to consider, may include:

- Age of person
- Person with additional needs eg hearing, visual, physical
- Emotional state eg angry, aggressive, upset / emotional
- Socio-economic status.

Scenarios may include:

- Emergency (eg RTC, severe haemorrhage)
- Admitting animals for surgery
- Euthanasia
- Complaint
- Dispute over payment.

Topic 2.3

Learners must be able to summarise the aims and purpose of the following legislation, linking to other learning outcomes within this unit.

The following is a list of relevant legislation that applies in the Animal Management sector. For purposes of assessment, there is no requirement for detail, but learners must appreciate that there is legislation and how these relate to daily regimes.

- Health and Safety at Work Act 1974,

- Control of Substances Hazardous to Health Regulations 2002 (COSHH) - to include how hazardous, non-hazardous, sharps and cadavers should be disposed of. Learners must also have an appreciation for safe handling and disposal of waste.
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR),
- Animal Welfare Act 2006
- Equality Act (2010).

Learners may look at other legislation appropriate to their selected species.

Learning outcome:

3. Care for an in-patient

Topics

3.1 Handle and restrain animals for veterinary procedures
3.2 Hospital accommodation
3.3 Medication

This outcome requires learners to monitor in-patients and perform 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 perform necessary checks and procedures. Learners need to be aware of the requirements for housing these animals whilst in the veterinary practice depending upon the species and individual needs. 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.

Prior to delivering this outcome, learners should revisit Unit 303 Animal Health LO1 – Recognise indicators of health in animals. Learners must be able to recognise signs of health in animals and carry out routine health checks.

Topic 3.1

Learners must be able to recognise the reasons and correct handling techniques for a range of species:

- Reasons for handling animals for Veterinary examinations (checking ears, eyes, teeth) and procedures (worming, flea treatment, vaccination, blood sampling, nail clipping, anal glands)
- Safe and correct handling techniques to include common restraint positions eg sternal and lateral recumbency
- Equipment specific to handling different animals i.e. pet carriers, collars, halters, leads, muzzles, crates, dog catcher and cat grasper, cat muzzle, cat restraining bag, gauntlets, crush cage (for cats and small mammals), towel
- Sexing techniques for a selection of species from the range
- Safely and correctly handle different species, that are of different sizes, ages and temperaments.

Topic 3.2

Learners will need to understand the types accommodation used for inpatients, to include:

- Layouts, design and size

- Isolation
- Bedding/ substrates.

Topic 3.3

This topic links to the 'Animal Health' unit. Learners will need to understand the administration of medication, to include:

- Routes of medicine administration to include topical, enteral, and parenteral and restraint techniques, advantages and disadvantages of these routes
- Drug categories – POM V, POM VPS, AVM – GSL, NFA – VPS
- Frequency of drug administration depending upon the drug choice and route
- Sourcing treatments to include: Vets, pharmacies, suitably qualified person, feed merchants
- Observation of the animal for adverse reactions and the action to take with a suspected reaction and who to notify.

Learning outcome:

4. Recognise procedures and equipment within a veterinary environment

Topics

4.1 Veterinary equipment
4.2 Veterinary anaesthesia
4.3 Radiography

This encourages learners' to investigate practice equipment and its suitability and efficacy for veterinary procedures. Introducing the learners to veterinary anaesthesia and radiography. Learners will be able to demonstrate practical skills on how to gown and glove, identify surgical instruments, anaesthetic equipment and how to undertake some basic x-ray positioning. They are not expected to use this equipment, but to gain knowledge and understanding of its functions and uses

Topic 4.1

Learners need to understand how to prepare, maintain and select veterinary equipment for the specific procedure and animal, cleaning and safety checks of the equipment, may include:

Equipment:

- Autoclave
- Dental machine
- Infusion pump / syringe driver
- ECG/Pulse oximetry/capnograph
- Endoscope
- Oesophageal stethoscope
- Blood pressure monitor
- Equipment required to administer fluid therapy.

Learners to identify common veterinary surgical instruments, to include:

- Forceps
- Artery forceps
- Scissors
- Retractors

- Blade handles and blade sizes
- Needle holders
- Tissue forceps
- Orthopaedic instruments
- Dental instruments and needles.

Learners to identify the reasons for fluid therapy, routes for administration and fluids used.

Topic 4.2

Learners need to have an appreciation of veterinary theatre practice and anaesthesia, to include:

- The equipment used in anaesthesia (circuits, ET tubes, inhalation gases)
- A basic understanding of anaesthetic monitoring (reflexes, respiratory rate, rhythm and depth, body temperature, mucous membrane colour, eye position)
- Basic theatre practice eg gowns, gloves, facemasks, opening and preparing surgical kits.

They must also be aware of health and safety with regards to ventilation and volatile agents.

Topic 4.3

Learners need to have a basic understanding of the equipment used for radiography to include:

- X-ray machine
- X-ray cassettes
- X-ray film
- Digital x-ray
- Processing equipment
- Positioning aids
- Safe lights
- Dosimeters
- Warning signs.

Learners need to identify how an x-ray is taken using the x-ray machine.

Learners must have an awareness of the health and safety considerations when dealing with radiography, to include:

- Basic radiation safety to include shielding, hazard lights, distance, PPE, signs, service records, relevant legislations, maintenance and storage of equipment, exposure records.
- The responsibilities of both the Radiation Protection Advisor and Radiation Protection Supervisor.

Delivery of this outcome could be supported through demonstration of basic animal positioning for x – rays, to include x-ray of the abdomen, chest, and limbs.

Guidance for delivery

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.

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.

Unit 316 Zoological Collections

UAN:	L/507/7151
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to develop an understanding of the role and systems of the modern zoological collection. The unit includes the role of the modern zoo, techniques used to improve the lives of zoo animals, the systems for effective zoo operation and features of sound zoo animal husbandry.

Throughout the unit, the delivery should be focused on aspects of health and safety (eg size, toxicity and disease transmission) incorporated when working with dangerous animal species and those subject to zoo Licensing Act (1981).

It will enable learners to develop safe working practices and behavioural competence as is appropriate and possible within the context in which they are working. It is anticipated that on completion of the unit learners could progress to more advanced study in the subject.

Learning outcomes

In this unit, learners will be able to

1. Understand the role of the modern zoo
2. Understand the techniques used to improve the lives of zoo animals
3. Understand the systems for effective zoo operation
4. Understand the requirements of zoo animal husbandry

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learners should select a minimum of 2 commonly kept zoo species from the range:

- Invertebrates
- Fish
- Amphibians
- Reptiles
- Birds
- Mammals eg primates, carnivorous mammals, aquatic mammals, ungulates and pachyderms.

Centres should be up to date with legislation, policies and codes of practice used in the taught content.

Learning outcome:

1. Understand the role of the modern zoo

Topics

1.1 The history and development of zoological collections
1.2 The role of modern zoos
1.3 Ethics in the zoo

In this outcome, learners will explore the history of zoological collections and their changing purpose and role in society. The learner will examine staff, visitor and animal needs and how zoos must compromise to meet these needs. Learners should be encouraged to analyse how society impacts the modern zoo and its changing relationship with the public.

Topic 1.1

Learners need to develop an understanding of the history and development of zoological collections, which may include:

- Menageries (eg travelling menageries)
- Private collections (including royal)
- Zoological gardens
- Research institutes opening to the public
- The changing purpose and ideals of the zoo
- Key historical events in the zoo world
- Changes of opinions
- Pressures, perceptions and expectations
- Zoo mission statements
- Funding, modern roles and challenges of the zoo today.

Topic 1.2

Learners need to understand the expectations of the visitor experience (systems of interpretation, demonstrations, talks, education).

Visitor expectations:

- Viewings
- Interaction with animal stock
- Practical considerations for visitor needs (access for all)
- Retail opportunities
- Safety of the visitor
- Visitor facilities
- VIP/ keeper for the day.

Interpretation and promotion of the zoo's mission statement:

- Formal and informal education
- Signage
- Interactive interpretation
- Taught sessions
- Keeper talks
- Public feeds
- Live animal demonstrations
- Shows.

Learners will need to evaluate the impact of the zoo as a conservation organization, to include:

- In situ and ex situ conservation
- Collection planning
- Breeding techniques
- Studbook
- European Endangered Species Programme (EEP); European Stud Books (ESBs)
- Ambassador species
- Release programmes
- Wild population reserves
- Links to external organisations to promote conservation
- Native species conservation.

Learners need to understand the impact of research in zoos, evidence based husbandry and environmental assessment. Learners should look at a variety of case studies which provide evidence of impacting husbandry to explore the following:

- The reasons why research is conducted in zoos
- The role of the keeper in research
- The role of the ethics review committee
- Weighing up research in the wild vs the zoo environment (what type of data can be collected, pros and cons)
- Captive research links to conservation programs.

Topic 1.3

Learners need to explore ethical issues and questions which arise in the zoo environment from an animal, visitor and staffing point of view. Learners should be encouraged to appreciate differing opinions of people from all backgrounds and with differing interests. Debating could be encouraged to allow learners to formulate their own opinions and come to conclusions over pertinent issues (eg live feeding, pinioning, marine mammals, ID systems, training, species kept).

Learning outcome:

2. Understand techniques used to improve the lives of zoo animals

Topics

2.1 Use of welfare audit to evaluate animal welfare

2.2 Improving welfare through enrichment

In this outcome, learners will identify atypical and stereotypical behaviours in zoo species, and understand the importance of environmental enrichment. A variety of methods of sensory enrichment are to be explored to illustrate how research in evidence based husbandry procedures are incorporated in zoos. Learners will be encouraged to debate the ethics of zoos as educational establishment Vs mean menagerie.

Topic 2.1

Learners need to understand the five animal needs and how they relate to the welfare of selected zoo species, which may also include:

- Correct group structure (eg sex ratios, solitary vs groups, bachelor groups)
- Benefits of mixed exhibits
- Observations of enclosure usage
- Observation of species behaviours (eg stereotypical)
- Format of welfare audits and need for regular review, where necessary

Topic 2.2

Learners need to define enrichment and research a range of enrichment techniques for selected zoo species, which may include:

- Food presentation (eg tongue puzzles, scatter feeding and provision of browse)
- Sensory (eg food scent trails)
- Training
- Aspects of enclosure design (eg frames, swings, ropes, platforms, raised areas)
- Socialisation and group structures
- Enrichment plans (adaptation to natural habitats, effects on animals)

Throughout their research, learners will also be required to acknowledge associated problems with enrichment techniques.

Learning outcome:

3. Understand the systems for effective zoo operation.

Topics

3.1 Zoo regulatory framework

3.2 Animal identification and record keeping

3.3 Dealing with emergencies in the zoo

In this outcome, learners will cover the theory and practice of zoo operations including regulatory frameworks, handling and restraint techniques as well as the emerging importance of operant conditioning to train animals for husbandry purposes. The identification of specimens and the collection and management of biological data on animals will be interpreted. Learners will need to understand protocols for a range of emergencies that may occur in the zoo.

Topic 3.1

The learner will need to understand the role and purpose of the following guidelines and legislation:

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- The Zoo Licensing Act 1981 (the inspection process and what happens if a collection fails to meet the required standards)
- The Secretary of State's Standards on Modern Zoo Practice/ The Zoos Expert Committee
- Endangered Species Act (eg CITES)
- Animal health legislation (eg Balai criteria)
- Animal movements (reference to core unit Animal Handling, optional unit Exotic Health and Husbandry)
- Waste management (reference to core unit Animal Handling)
- World Health Organisation.

Topic 3.2

Learners need to understand the role and importance of record keeping in the zoo environment:

- Techniques for identifying individual animals including physical characteristics, transponders, rings, ear tags, mutilation and tattooing
- The importance of biological data for the specimens held in the collection
- The information that needs to be recorded
- The role of Zoo Information Management Systems (ZIMS), the collection registrar and the daily diary.

Topic 3.3

Learners need to understand different emergency procedures and protocols in situations such as:

- Emergencies in the zoo including animal escapes, fire, floods, lost persons, enclosure invasions, accidents and other medical emergencies
- The preparation and staff training for emergencies including communication, the chain of command and the use of firearms.

Learning outcome:

4. Understand the requirements of zoo animal husbandry

Topics

4.1 Health and Hygiene and Biosecurity
4.2 Nutrition strategies in zoos
4.3 Principles of exhibit design
4.4 Techniques for the handling and restraint of zoo animals

In this outcome, learners will explore the features of sound zoo animal husbandry focussing on symptoms, identify appropriate treatments and describe how zoo practitioners can prevent or eliminate disease transfer. The learner will investigate developing nutritional strategies and

complete the unit producing a taxon specific project to consolidate their learning.

This outcome links to the 'Animal Health' and 'Nutrition and feeding' units. Learners will need to use their knowledge from this unit and link it to zoo animal species.

Topic 4.1

Learners will need to have an understanding of the importance of health and monitoring, to include:

- Initial assessment
- Frequency
- Record keeping
- Liaison with external experts (eg vets)
- Recognition that much of the above will become the keepers role with reporting up to higher levels.

Learners need to identify preventive measures designed to reduce the risk of pathogenic disease and transmission, to include:

- Vaccination of zoo species
- 'Intelligent parasite control' and possible long term effects.
- Quarantine
- Routine blood/faecal testing and screening (taking into account the ethics of mandatory annual animal 'MOT')
- Elimination/trapping of vectors
- Use of physical barriers to isolate/exclude
- Zoonosis/ zooanthroponosis.

Learners need to identify causes of husbandry induced issues such as:

- physical trauma
- poisoning
- malnutrition
- secondary bacterial infections
- foreign bodies

Topic 4.2

Learners need to identify different nutrition requirements for selected zoo species, to incorporate the following:

- Life stage (juvenile, adult, pregnancy, lactation and geriatric)
- Health status
- Size
- Climate and environment
- Seasonality
- Nutritional composition of feedstuffs to develop feed plans (fresh vs concentrates)
- Appropriate presentation method for food and water
- Reasons for supplementation eg correction of nutritional deficiencies (vitamins and minerals)
- Zoo diet evaluation software eg zootrition.

Topic 4.3

Learners must understand the principles of enclosure design for exhibiting which may include:

- Design rationale
- 'matching the wild'
- welfare standards impacted by accommodation

- Breeding facilities
- Viewpoints and aesthetics
- Management features built in
- Immersion exhibits
- Naturalistic designs
- Cost implications
- Regular review of accommodation.

Learners will need to have knowledge of enclosure design considerations, to include:

- Dimensions and shape
- Balance between indoor and outdoor areas
- Landscaping (vegetation, water features, shelter)
- Use of materials and substrates
- Mix of species (interspecies /intraspecies)
- Proximity of enclosure to other species
- Barriers (fences, moats, posts and bars, glass, netting, wire or water)
- Regulation of the atmosphere (temperature, humidity and light)
- Animals able to demonstrate a repertoire of normal species specific behaviours
- Strategies for the avoidance of stereotypical behaviour
- Use of sustainable resources (low energy light bulbs, biodegradable substrates and bio fuels).

Topic 4.4

Learners need to understand the following factors for safe handling and restraint of zoo animals:

- Manual handling techniques- handling equipment nets, gloves, catchpoles, crushes, push boards
- Risk assessment around handling and restraint
- Chemical sedation and immobilisation
- The role of training in the management of zoo animals for veterinary procedures
- Animal movement and keeper safety for species such as elephants, apes and large carnivores

Delivery of this Topic could be supported through demonstration, use of videos, photos and input from employers.

Guidance for delivery

This unit is designed for the learner to develop an understanding of the role and systems of the modern zoological collection. The delivery of the unit is expected to incorporate a mixture of lectures and visits to zoological collections where learners can benefit directly from the expertise of staff input.

Centres are encouraged to provide vocational relevance to the unit by visits to animal collections, and incorporate the use visual observation of selected zoo species.

Delivery of unit content will involve formal lectures and linkage to visits by worksheets, and hosting visits by professionals from animal collections to centres.

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

During LO2, when discussing Ethics in the Zoo there needs to be an emphasis on the use of case studies and research to allow learners to formulate their own opinions on the subject. This should be presented by the lecturer in the most objective way possible in order not to bias their point of view. This is a very useful aspect of the unit which examines equality and diversity issues.

Unit 317 Farm Livestock Husbandry and Welfare

UAN:	D/507/7154
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to develop 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

In this unit, learners will be able to

1. Understand the production systems for farm livestock
2. Carry out handling techniques for farm livestock
3. Understand and maintain the environmental conditions required for farm livestock
4. Understand and maintain the feed and water requirements for farm livestock

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

This unit can cover any suitable livestock, for example farm animals, such as pigs, cattle, poultry and sheep or large mammals such as goat, camelids or other available large mammals.

Learning outcome:

1. Understand the production systems for farm livestock

Topics

1.1 The use of different breeds of common farm livestock in production systems

1.2 Production systems for common farm livestock.

Topic 1.1

Learners will need recognise the use of common farm livestock in production systems, which will include:

- 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 (eg milk, meat and egg production data).

Topic 1.2

Learners will need to discuss production systems for common livestock, to include:

- Type of production system (indoor, outdoor)
- Intensive
- Organic
- Free range
- Length of time animal is in system
- Slaughter age.

Learning outcome:

2. Carry out handling techniques for farm livestock

Topics

2.1 Demonstrate animal health checks on farm livestock

2.2 Equipment to be used when carrying out handling techniques for farm livestock

2.3 Handle farm livestock safely in a way that complies with relevant legislation, minimises stress and injury

2.4 Animal records

Topic 2.1

Learners will need to demonstrate animal health checks, to include:

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)
- Condition scoring techniques.

Topic 2.2

Learners will need to demonstrate the use of handling equipment, which may include: (head collars, ropes and halters, races, crush, calf crate, pig boards, weigh crate), choice of equipment according to situation.

Topic 2.3

Learners will need to understand the reasons for handling, restraint and movement of farm livestock, to include:

- Reasons such as 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.

Topic 2.4

Learners will need to have an appreciation of the documentation required for livestock, which may include:

- Cattle passports
- Appropriate animal records
- 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.

Learning outcome:

3. Understand and maintain the environmental conditions required for farm livestock

Topics

3.1 Accommodation requirements of indoor reared farm livestock
3.2 Accommodation requirements of outdoor reared farm livestock
3.3 Routine maintenance of farm livestock accommodation

Topic 3.1

Learners will need to explain the accommodation requirements of indoor reared farm livestock to include:

- Ventilation, insulation, flooring, drainage, lighting, temperature, space allowance
- Relevant current codes of practice, Animal Welfare Act 2006, Welfare of Farmed Animals (England) Regulations 2007, Health and Safety at Work 1974.

Topic 3.2

Learners will need to explain the accommodation requirements of outdoor reared farm livestock to include:

- Shelters, boundaries, hedges, management of grassland
- Relevant current codes of practice, Animal Welfare Act 2006, Welfare of Farmed Animals (England) Regulations 2007, Health and Safety at Work 1974.

Topic 3.3

Learners will need to demonstrate maintenance of accommodation, to include:

- 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 eg Environmental Protection Act 1990 (as amended 1995), disposal of fallen stock.

Learning outcome:

4. Understand and maintain the feed and water requirements of farm livestock

Topics

4.1 Suitability of feed rations according to purpose and life stage of common farm livestock
4.2 Presentation and preparation of feed and water for common farm livestock

Topic 4.1

Learners need to identify and select appropriate feeds to a range of farm livestock, which may include:

- Type: (dry/wet, concentrates, crops, silage, hay, supplements)
- Quantity of feed according to production
- Life stage and health status (eg weaning, pregnant, lactating, adult, ill, purpose of animal)
- Quality of feed (best before dates, stock rotation)
- Nutrient content of ration eg protein, carbohydrate, fats, vitamins and minerals, water intake.

Topic 4.2

Learners need to identify and provide appropriate feeds and feeding equipment appropriate for the chosen species, to include:

- Presentation of feed: containers
- Prepare food according to instructions
- Checking water is fresh and clean
- Equipment for life stage
- To consider insect and rodent infestations and mould.

Guidance for delivery

This unit is designed to provide the learner with the knowledge and skills required to work with and manage farm livestock.. 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' (eg mating, lambing).

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.

Unit 318 Fundamentals of Science

UAN:	M/507/7160
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to provide a sound scientific foundation on which further study can be built on. This unit is primarily aimed at learners within a centre-based setting looking to progress into higher education or further training within the sector. It is envisaged that this unit will allow access to higher education courses including veterinary science; bio-veterinary science; animal science; zoology etc.

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 animal tissue, equilibrium concepts, principles of experimental design and develop skills in communicating scientific information.

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.

Learning outcomes

In this unit, learners will be able to

1. Measure quantities for chemical reactions
2. Interpret the key features of equilibrium processes using the principles of good experimental design.
3. Identify structures and functions in different tissue types
4. Communicate scientific information

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Measure quantities for chemical reactions

Topics

1.1 Identify hazards and controls associated with chemical reactions
1.2 Key features of the periodic table, atomic structure and chemical bonding
1.3 Prepare chemical solutions and test their accuracy
1.4 Carry out volumetric calculations leading to accurate chemical quantities required for reactions

This outcome introduces learners to the periodic table. It enables learners to produce a range of solutions and test their accuracy using analytical methods, the principles of which are used in industry or research laboratories. It also allows learners to gain knowledge about potential chemical hazards such as the preparation and mixing of alkali and acidic solutions.

Topic 1.1

Learner need to identify the hazards and controls associated with chemical reactions, which may include:

- Laboratory safety symbol interpretation
- Personal Protective Equipment (PPE)
- Hazard identification and risk assessment.

Topic 1.2

Learners need to understand the properties of the elements in the periodic table and atomic structure. This must include:

- Elements. Mixtures and Compounds
- Atomic structure (neutrons, protons, electrons)
- Mass and charge of Protons, Neutrons and Electrons
- Principle of electron shells and how these are filled
- Electronic configuration and place in the Periodic Table
- Electronegativity
- Structure and uses of isotopes.

Learners will need to outline the key features of chemical bonding, to include:

- The formation of Ionic and Covalent bonds
- The relevance of Hydrogen bonds and Van de Waals forces
- Hydrophilic/hydrophobic interactions
- Use of the periodic table to determine the structure of simple ionic and covalent compounds.
- Balancing chemical equation.

Topic 1.3

Learners will need to measure accurately amounts of solid, liquid and gaseous chemicals. This may be done by use of balances, measuring cylinders, burettes and gas syringes.

Learners will need to prepare chemical solutions and cover the following:

- 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 and units used
- Serial dilution of solutions and mixing of solutions of different molarities to obtain the required concentrations.

Learners will need to test the accuracy of the prepared solutions by measurement of the concentration of solutions by a common industrial assay such as by a titration, colorimetric or spectrophotometric technique.

Topic 1.4

Learners will need to carry out calculations, which must include:

- Moles and molarity
- Avogadro's constant
- Calculations involving mass, moles, concentrations and volumes (eg M=CV, MaVa = MbVb)
- Units and interconversions (eg mol, dm^3, cm^3, mol dm^{-3}, g, $gmol^{-1}$).

Learning outcome:

2. Interpret the key features of equilibrium processes using the principles of good experimental design

Topics

2.1 Principles of experimental design

2.2 Equilibria of liquids and gases across membranes

This outcome introduces learners to principle of analytical and diagnostic techniques used in industry and research laboratories and the importance of strong experimental design.

In this outcome learners will explore the nature of reversible reactions; the dynamic nature of equilibrium and the significance of equilibrium equations. Learners will apply the concept of equilibrium to biological processes. The learners will undertake practical investigations but this will be underpinned by formal lectures.

Topic 2.1

Learner needs to know the importance of the following as part of good scientific experimental design.

- The use of controls
- Calibrations
- Only changing one parameter at a time
- The importance of known values or normal values
- Graphical representation of results

Topic 2.2

Learners must describe the following:

- Reversible reactions
- The 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.
- The effect of temperature and catalysts on the establishment of equilibrium.

Learners need to analyse the equilibria of liquids and gases across membranes, to include:

- Diffusion
- Osmosis
- Water potential
- Membrane potential
- Oxygen-haemoglobin dissociation curve

Learners will investigate the drive towards equilibrium using potato cores and a range of sugar solutions.

Learning outcome:

3. Identify structures and functions in different tissue types

Topics

3.1 Microscopy
3.2 Observations of different types of tissues from a light microscope
3.3 Observation of electron micrographs of different types of tissues
3.4 Preparation of histological specimens

Electron micrographs provide sufficient magnification for learners to practice the identification and annotation of cell organelles and their function. 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. Learners will describe the different range of microscopes and their applications. Learners need to know how specimens are prepared and stained, this could be undertaken in the lab or via visits to local universities or hospitals.

For this outcome, learners should cover the following range:

- Tissue types: epithelial, connective, nervous, muscle
- Light microscopes, Transmission electron microscopes, Scanning electron microscopes.

In this outcome learners will discover how to use a range of microscopes; the preparation techniques used for a range of samples. Learners will become familiar to 'normal' tissue samples.

Microscopy is a very important diagnostic tool used in the veterinary science field. It is important for learners to appreciate what normal tissue will look like in order to diagnose potential disorders or diseases. In this unit learners will discover microscopy; the differences between light and electron microscopy and the applications of these techniques.

Topic 3.1

Learners will need to outline the key principles and function of a range of microscopes and their applications. This will include:

- Compound light microscope
- Stereo light microscope
- Transmission electron microscope
- Scanning electron microscope.

Topic 3.2

Learners need to record their observations of different types of tissues from a light microscope to include:

- Dense, loose, regular, irregular and fluid connective tissues
- Simple and stratified epithelial tissues
- Skeletal, cardiac and smooth muscle types
- Nervous tissue.

Topic 3.3

Learners need to interpret electron micrographs of different types of tissues to include:

- Dense, loose, regular, irregular and fluid connective tissues
- Simple and stratified epithelial tissues
- Skeletal, cardiac and smooth muscle types
- Nervous tissue.

Topic 3.4

Learners need know how histological samples are prepared and stained. These will include:

- Fixation, embedding (chemical and freezing), sectioning and staining
- Hematoxylin and eosin staining
- TEM samples
- SEM samples.

Learning outcome:

4. Communicate scientific information

Topics

4.1 Methods by which scientific information is communicated

4.2 Report on a scientific investigation

In this outcome, 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 journal paper, and a report in an alternative media such as webpage, popular press article, podcast or broadcast.

Topic 4.1

Learners will need to outline the communication methods used for scientific information, which may include:

- 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.

Topic 4.2

Learners will need to report of a scientific investigation that has been carried out. The scientific investigation can be sourced from published primary sources or from learners own investigation which may be from this unit or another suitable investigation.

Guidance for delivery

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.

Concentrations of a range of solutions is regularly expressed within the fields of chemistry and biology, learners should be confident with these terms and the conversion between the units. 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.

One of the most useful diagnostic tools available to biomedical practitioners is microscopy. It is very important that a learner can set up a microscope correctly in order to gain the best resolution of a specimen. The learner should know the techniques used to prepare a specimen and the importance of knowing what normal tissue looks like and how this knowledge can be used when looking a tumour borders etc.

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. 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.

Unit 319 Inheritance and Genetics

UAN:	A/507/7162
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to develop knowledge and understanding of the principles of inheritance and the applications of genetic manipulation in animals. The aim is for learners to build upon some basic knowledge of genetics to gain a deeper understanding of the underlying mechanisms by which traits are inherited, and to be able to apply this knowledge to evaluating recent advances in scientific techniques and their implications for the animal industry.

This unit is primarily aimed at learners looking to progress into a scientific based sector, or onto higher education or training.

Learning outcomes

In this unit, learners will be able to

1. Understand the molecular basis of inheritance
2. Understand the principles of Mendelian genetics and gene interactions
3. Understand the principles of population genetics
4. Understand the principles of genetic manipulation

Scope of content

This unit will be covering the biochemical and molecular structure of DNA and how this is replicated. The implications of errors in replication and the main causes of variation will be discussed, with examples of genetic errors and variation of traits in a variety of animals. The unit is designed to build on a basic knowledge of genes and how traits are passed on, to develop a deeper understanding of more complex gene interactions and how recent studies in epigenetics make predicting genetic variation more complex. Variation within populations and the impacts that this has on population genetics will be discussed. This should lead in to a discussion of long term natural selection and evolution and how to test if a population is changing over time, though the use of statistical techniques. The unit should have a strong emphasis towards incorporating information about recent advances and techniques and the ethical implications of these. All opportunities should be taken to practice practical techniques and encourage independent research and evaluation skills to prepare the learners for moving on to higher education or further training in this field where such techniques will be regularly applied.

Learning outcome:

1. Understand the molecular basis of inheritance

Topics

1.1 The structure of DNA
1.2 DNA replication
1.3 Chromosomal structure

This outcome explores the molecular basis of inheritance. Learners must be aware of the link between the structure and function of nucleic acids. Using molecular models or using modelling clay can help to make learners aware of the 3D nature of the structures within DNA and chromosomes. The sequence of events during DNA replication (including proof-reading and repair) must be covered, along 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.

Topic 1.1

Learners need to be able to identify the biochemical structure of the sugar-phosphate backbone in DNA and RNA.

Learners need to be able to identify the biochemical structure of:

- Cytosine
- Guanine
- Adenine
- Thymine
- Uracil.

Learners need to understand the difference between purines and pyrimidines and how base pairs form.

Learners need to understand the differences between DNA and RNA (including tRNA, mRNA and rRNA).

Learners also need to understand the importance of DNA within the body and in inheritance.

Topic 1.2

Learners need to understand the process of semi-conservative DNA replication (Meselson-Stahl experiment).

Learners need to be able to name and explain the four enzymes involved in transcription:

- Helicase
- Polymerase
- Primase
- Ligase.

Learners need to define the terms "replication forks" and "Okazaki fragments" and explain why these occur on the lagging strand.

Learners need to identify possible causes of mutations, to include:

- Spontaneous (mainly through endogenous factors such as a failure of DNA repair mechanisms)
- Induced (mainly through exogenous factors such as mutagens or radiation).

Learners need to appreciate the importance and mechanisms of proof-reading and repair in preventing mutations. These can be illustrated by consequences of errors in animals eg Syringomyelia in King Charles Spaniels or Dermoid Sinuses in Rhodesian Ridgebacks.

Topic 1.3

Learners need to understand how chromosomes are formed by winding chromatin around histone nucleosomes to form euchromatin, and how this is coiled to form heterochromatin.

Learners need to explain epigenetics and the effect of modification of chromosome structure on the expression of alleles. Learners need to be able to identify chromatids and chromosomes and explain how karyotypes vary between species. Learners should also define telomeres and their possible functions.

Learning outcome:

2. Understand the principles of Mendelian genetics and gene interactions

Topics

2.1 How the behaviour of chromosomes during meiosis leads to variation

2.2 The effect of mutations on variation

2.3 Monohybrid and dihybrid inheritance ratios and probability tests

This outcome follows on from outcome 1 and explores the contribution of chromosomal behaviour during meiotic divisions to the potential variation in 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. Proof-reading mechanisms can be discussed alongside real world examples of the results of errors. Opportunities should be given for students to conduct independent research and present their findings about the causes of specific problems. 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 ratio.

Topic 2.1

Learners need to use their knowledge of mitosis to explain the importance of the differences from meiosis. Learners need to understand the formation of homologous pairs during prometaphase 1 and the process of crossing over. Learners need to have an appreciation of the concept of effect of linked genes and the effect of distance on inheritance. Learners need to be able to describe the effect of chromosomal arrangement during metaphase 1 on independent assortment and how this leads to variation. Learners also need to be able to identify examples of continuous and discontinuous variation and polygenic traits.

Topic 2.2

Learners need to understand how mutations can be:

- Harmful
- Beneficial
- Neutral.

Learners need to be able explain and illustrate the mechanisms of different forms of mutations, and give examples. Types of mutations to discuss include:

- Point mutations; how changing one base can lead to effects that are either neutral/silent, missense or nonsense
- Larger changes such as substitution, insertion, deletion, translocation, duplication, frameshift and non-disjunction of chromosomes

Topic 2.3

Learners will need to review understanding of Mendelian laws and practise full interpretation of Punnett Squares, from learning outcome 1, by using both heterozygous and homozygous genotypes including phenotypic ratios.

Learners need to construct and interpret genetic diagrams for both monohybrid and dihybrid crosses to F2 generation.

Learners need to be able to describe genetic interactions that may affect predicted ratios, including examples of the following:

- Codominance or incomplete dominance
- Multiple alleles
- Sex-linked traits
- Lethal genes
- Epistasis.

Learners also need to be able to complete and fully interpret a chi-squared probability calculation to establish whether expected values vary significantly from observed data.

Learning outcome:

3. Understand the principles of population genetics

Topics

3.1 The process of evolution through natural selection

3.2 Evolution in terms of the Hardy-Weinberg Principle

This outcome requires learners to study the principles of population genetics and evolution through natural selection. 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, along with its relevance to evolution. The ability to use the Hardy-Weinberg equation is required.

Topic 3.1

Learners need to understand the effects of spontaneous and induced mutation on populations with reference to examples of heritable changes and how this could lead to altered selection pressures. Learners need to be able explain the difference between the terms "natural selection" and "evolution". Learners need to evaluate the evidence supporting the theory of evolution with reference to ring species and phylogenetic data. Learners need to explain how and why gradual accumulation of acquired adaptations in a variety of animal examples, and the changes which have resulted.

Learners also need to be able to define and illustrate terms used in population ecology including:

- Stabilising, directional and disruptive selection
- Gene pool, genetic drift, founder effect, gene flow, and bottlenecking.

Topic 3.2

Learners need to be introduced to and have an appreciation of the concepts of allele frequencies and the need for population ecologists to be able to predict these in a stable population.

Learners need to be able to utilise the Hardy-Weinberg equation ($p^2+2pq+q^2 = 1$ where p^2 is the frequency of homologous dominant individuals, 2pq is the frequency of homozygous carriers and q^2 is the frequency of homozygous recessive individuals) to predict, given a population survey of phenotype ratios, how many of that population would be heterozygous.

Learners need to understand the conditions required for the H-W equilibrium to apply.

Learners also need to explain the use of the H-W equation to predict evolution of populations, to include:

- Using H-W allele frequencies derived from a previous generation, calculate the expected ratios of phenotypes in the subsequent generation
- Demonstrate how a population can be assumed to be evolving if a significant difference is found (with a Chi-Squared test) between the observed and the expected phenotype ratios.

Learning outcome:

4. Understand the principles of genetic manipulation

Topics

4.1 Techniques used in genetic manipulation
4.2 Applications of genetic manipulation
4.3 Advantages and disadvantages of genetic manipulation techniques

This outcome requires the learner to be able to understand 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 on to examination of practical limitations and how they may be overcome. Delivery of this outcome should be fluid enough to allow discussions to arise of examples of practical applications and about the ethical implications of these techniques. Emphasis should be given to encouraging discussion of any relevant uses that are receiving media attention, for example bio-assaying of species DNA found within foodstuffs. 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. Genetic modification of plants may be relevant in relation to foodstuffs for the farming industry.

Topic 4.1

Learners need to understand the use of simple DNA extraction techniques. Learners need to select the required equipment and demonstrate the steps of the polymerase chain reaction (including use of restriction enzymes) and interpret the results of gel electrophoresis or Southern Blot Technique.

Learners to investigate and report on the techniques used in recombinant DNA technology including:

- Use of marker genes
- Use of vectors in transfection and transduction
- Animal cloning (from early embryo splitting to somatic cell nuclear transfer).

Topic 4.2

Learners to explain examples of the current uses of biotechnology in the animal industry. Include a range from the following techniques:

- Genetic testing eg Avian gender determination, the Canine Inherited Disease Database
- Analysis of gene function and regulation eg Enviropig, regulation of wound healing by growth factors
- DNA fingerprinting eg paternity testing, bio-assaying, forensics, genetic counselling
- Gene targeting eg knockout mice
- Cloning eg stem cell research, extinct or endangered species
- Transgenics in farming and production of pharmaceuticals from animals eg insulin, alpha-1 antitrypsin.

Topic 4.3

Learners to have an appreciation of the practical limitations of techniques and how limitations might be overcome in the future.

Learners need to have an appreciation of the commercial, social and ethical considerations of genetic manipulation in animals.

Guidance for delivery

The context of this unit should be animal-based, though clearly some elements (such as DNA structure) are common to many organisms and as such do not require species-specific illustration. The tutor must cover as broad a range as possible in order 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. For that reason it is recommended that up to date journals and articles are used in order to enhance the delivery of this unit. 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. Where direct laboratory work is impractical, simulations can be used and data provided for analysis.

Genetics is an area which often provokes great controversy. 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. Learners should be encouraged to participate in debates whilst maintaining a professional respect for other viewpoints.

Many links to other scientific units (such as Biological Systems) 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.

There are many high quality resources available online that may be used to deliver this unit. Some 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. Learners should be encouraged to critically analyse the quality and reliability of any sources used.

Unit 320 Chemistry for Biology Technicians

UAN:	J/507/7164
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to understand the principles of chemistry for biology technicians and how these can be put into practice. The unit will provide a sound scientific foundation on which further study can be built on. This unit is primarily aimed at learners within a centre-based setting looking to progress into higher education or further training within the sector. It is envisaged that this unit will allow access to higher education courses including veterinary science; bio-veterinary science; animal science; zoology etc.

The learner will be able to describe enthalpy changes and apply these to bond making and bond breaking. In addition, they should be able to apply this to calorimetry and metabolism of food groups. The learner will carry out experimental investigations to underpin the principles that effect the rate of reactions. Learners will explore what makes substances an acid or a base and how the pH is important in biological systems. Learners will investigate neutralisation reactions and how the dissociation of an acid will alter the titration curve. The structure and functions of organic molecules will be examined.

Learning outcomes

In this unit, learners will be able to

1. Relate enthalpy changes to the bonding of a range of substances
2. Show how rates of reaction are affected by varying the reaction conditions
3. Interpret key features of acids, bases and buffering
4. Demonstrate the structure and properties of simple organic molecules

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Food groups will include carbohydrates, proteins and lipids

Organic compounds will include carbon chain and ring structures up to 10 carbons long.

Learning outcome:

1. Relate enthalpy changes to the bonding of a range of substances

Topics

1.1 Types of energy transfer

1.2 Investigate the Enthalpy of neutralization and formation and apply to Hess's law

1.3 The calorific value of different foods and fuels

In this outcome, learners will gain a working knowledge of energy transfer and the laws of thermodynamics which should be contextualised to animal examples. Calorimetric determination forms the investigative element of this outcome. Learners should be encouraged to not only compare the food groups but also to compare fuels. Learners should evaluate the method used and compare their finding to published data and to industrial methods.

Topic 1.1

Learners need to describe the different types of energy transfer, this must include:

- First, second and third laws of thermodynamics
- Entropy
- Standard conditions
- Enthalpy as an extensive property and function of state
- Enthalpy diagrams, calculation and measurement
- Standard enthalpy changes (combustion, formation, neutralisation and reaction) linked to bond formation and bond breakage
- Theory and application of Hess's law.

Topic 1.2

Learners need to investigate the H (neutralisation) this can be done using a polystyrene cup and lid and using hydrochloric acid and sodium hydroxide as the reagents. Learners should also investigate H (formation) this could be undertaken one using a similar calorimeter as above but using anhydrous and hydrated copper sulphate. Learners need to apply Hess's Law to determine enthalpy changes in reactions.

Topic 1.3

Learners need to investigate the calorific values of different fuels which must include the experimental values need to be compared to theoretical data or bomb calorimeter results when the losses to the environment and experimental design can be described.

Calorimetric determination of:

- Carbohydrate based food
- Lipid based food products
- Protein based food product
- A hydrocarbon fuel fraction.

Learning outcome:

2. Show how rates of reaction are affected by varying the reaction conditions

Topics

2.1 Reaction rates and mechanisms

2.2 Experiments to show the effect on the rates of reactions of changes in concentration, particle size, temperature and presence of a catalyst

In this outcome learners need to understand reaction rates and mechanisms. Learners will describe the principles that alter the rate of reaction.

Topic 2.1

Learners will need to describe the principles used to explain rates of reaction and the mechanisms. They will describe reaction kinetics, the rate determining steps and the order of a reaction and the calculation of rate constants.

- Units of rate (mol dm-3s-1
- Collision and Transition state theory
- Homogenous and Heterogeneous Catalysts
- Activation Energy
- Reaction Profiles
- Reaction Kinetics
- Reaction Mechanisms (elementary reactions, slow, fast and reversible steps).
- Ideal gas constant
- Maxwell-Boltzmann Distribution
- Reactions with Orders 0, 1 and 2
- Rate Determining Steps
- Measuring the rate of reaction: the instantaneous, initial, general and average rate of reaction.

Topic 2.2

Learners will investigate the effect of the following parameters on the rate of reaction. Learners are to calculate the initial rate of reaction for each parameter. This could be investigated using a simple marble chips and hydrochloric acid reaction. The importance of a catalyst could be investigated using the zinc and sulphuric acid reaction with copper turning or solution as the catalyst. Alternatively a starch amylase reaction could be used for all the parameters. These to include:

- Concentration
- Temperature
- Particle size.

Learners will investigate enzymes and the effect of temperature, catalyst, pH, substrate/product concentrations and inhibition.

Learning outcome:

3. Interpret key features of acids, bases and buffering

Topics

3.1 Acids and bases

3.2 Investigation of the titration curves

3.3 Buffering and the importance of buffering in biological systems

In this outcome learners will explore what makes an acid and a base. They will describe the difference between strong acids and concentrated acids and dilute acids and weak acids. Learners will explain how Ka can be used to describe the dissociation of the acid. Learners will discover the importance of pH and how it is calculated. Learners will investigate neutralisation reactions of acids and bases. They will also describe buffering and its importance in biological systems.

Topic 3.1

Learners must describe the principles used to define acids and bases. The learner will be able to explain and to calculate pH values. These to include:

- Brønsted-Lowry theory
- Conjugate acid-base pairing
- Amphiprotic substances (including water)
- Ionisation/dissociation constants
- Variation in strength of binary acids and carboxylic acids
- Self ionisation of water
- pH scale
- Calculation of pH and pOH
    - Hydrogen ion concentration in aqueous solutions
    - K_w, Henderson-Hasselbalch equation
    - $pH = \log_{10}[H+]$, $[H+]=10^{-pH}$
- Strong acids v Concentrated acids
- Dissociation constants Ka and pKa
- How the acid dissociation constant, Ka, provides information about the extent to which acids and bases dissociate in aqueous solution
- Calculation of equilibrium in solutions of weak acids and weak bases.

Topic 3.2

Learners will need to investigate titrations of acids and bases and produce titration curves which will include the following:

- Strong acid v strong base titrations
- Weak acid v strong base titrations
- Selection of pH indicators for the titrations
- Alternative ways to determine the end-point.

Topic 3.3

Learners will be able to outline what a buffer solution is and its application to chemical and biologicals systems.

- Buffer solutions and buffering
- Range and capacity of buffers
- Effect of pH on amino acids and zwitter ion formation
- Buffering in biological systems and homeostasis eg pH levels in the blood phosphate buffers in the internal fluid of cells.

Learning outcome:

4. Demonstrate the structure and properties of simple organic molecules

Topics

4.1 Simple organic compounds

Learners will know the importance of the homologues series and functional groups in organic chemistry. In this outcome, learners will be required to identify organic molecules using IUPAC systematic nomenclature. They will produce structural formulae for a range of simple organic molecules and identify different types of isomerism. Learners should have the opportunity to gain practice in drawing, modelling and identifying organic molecules and predicting the properties of simple examples based upon experimental findings and functional groups.

Topic 4.1

Learners will need to be able to construct structural formulae for named examples of simple organic compounds listed below. These should include straight chain and ring structures where appropriate. They will also need to list typical properties of the listed compounds, to include:

- Short chain alkanes
- Alkenes
- Alcohols
- Halogenoalkanes and Halogenoalkenes
- Carboxylic acids
- Aldehydes
- Ketones
- Ethers
- Esters
- Amines
- Amides.

Topic 4:2

Learner will describe with examples the following:

- Linear and ring structure of sugars
- Differentiation between aldehyde and keto sugars
- Structural isomers
- Positional isomers
- Geometric isomers
- Optical isomers.

Guidance for delivery

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. Learners are encouraged to gain practical experience of calculating the equilibrium constant as well as those required when working with acids and bases. Learners will develop the knowledge of the importance of buffers to biological systems.

Outcome 4 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.

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.

Unit 321 Cell Biology and Genetics

UAN:	D/507/7168
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to develop their knowledge and understanding of the structure and function of cells and tissues. Learners will also investigate how genetic information is used in the construction of an organism and predict how these traits can be passed on to the next generation, and what might affect heritability.

Learning outcomes

In this unit, learners will be able to

1. Understand the structure and functions of biological cells
2. Understand the structure, function and replication of DNA
3. Understand the principles of Mendelian inheritance for predicting inheritance
4. Understand the structure and function of tissues

Scope of content

This unit will be focussed on building learner knowledge of the basic structure and function of cells, working towards an understanding of their structure and composition, their physiological properties, and the effects of interactions with their environment.

This unit will cover aspects of cell lifecycle, division and death. Knowing the components of cells and how cells work is fundamental to all biological sciences. Knowledge of the similarities and differences between cell types will be essential to any further research or careers within the fields of developmental and molecular biology.

The goal is that by the end of this unit, all learners should be able to apply an understanding of the cellular structure of animal systems to understanding the mechanisms behind the functions of different tissue types.

Learners should be able to explain how and why specific traits arose and how they are likely to be passed on to the next generation.

The species covered should broadly be mammalian but reference to other living organisms should be made where appropriate.

Learning outcome:

1. Understand the structure and functions of biological cells

Topics

1.1 Cell components of a mammalian cell
1.2 Functions of the organelles and life cycle of a cell
1.3 Comparison of cell types

This outcome covers cells and organelles. Delivery of this outcome should cover the structure and functions of the internal anatomy of an animal cell. Electron micrographs of cells can be used to illustrate cell organelle structure, while learners can appreciate the 3-D nature of a cell by observing models. There are many animations and other useful resources available on the internet. Use of light microscopes to identify different types of cell, as well as specialist animal cells is encouraged.

Topic 1.1

Learners need to identify the components and functions of the following animal cellular organelles and the main contribution each organelle makes to cellular function:

- Nucleus (nucleolus, nuclear envelope, chromatin)
- Mitochondria
- Microfilaments
- Golgi apparatus
- Rough endoplasmic reticulum
- Smooth endoplasmic reticulum
- Ribosomes
- Centrioles
- Plasma/cell membrane
- Cilia

- Lysosomes
- Vacuoles.

Topic 1.2

Learners need to understand the cellular processes carried out by each organelle, and how the cell components are involved in:

- Active transport and passive transport (movement of molecules into and out of cells)
- Cell signaling (regulation of cell behaviour by signals from outside)
- Autophagy (the cellular destruction of internal components or microbial invaders)
- Cell movement (through use of cilia and flagella or through contraction)
- Metabolism (covering what structures are involved with glycolysis and respiration).

Topic 1.3

Learners need to be able to:

- Identify the key differences between plant, animal, bacterial and fungal cells
- Discuss how animal cells can be specialized for specific functions eg red blood cells, neurons, spermatozoa and ova.

Learning outcome:

2. Understand the structure, function and replication of DNA

Topics

2.1 The structure and function of DNA and RNA
2.2 The process of DNA replication
2.3 The process of protein synthesis from DNA

This outcome covers an introduction to genetics, the structure of DNA and how traits are inherited. Learners should be able to draw or model these stages, labelling features of note. Scientific drawing of diagrams is useful practice and should be encouraged over the use of copied imagery (especially as many images available on the internet are less than fully reliable).

Topic 2.1

Learners need to be aware of the detailed structure of DNA and RNA, to include:

- Structure of DNA and RNA including nucleic acid pairing
- Gene expression (what is a gene and a chromosome), chromosome numbers in different animals and how chromosomes are involved in sex determination (including examples of non- disjunction such as Kleinfelter's syndrome, Turner's Syndrome and XYY syndrome).

Topic 2.2

Learners need to be able to identify the two types of cell division and the roles they play in a variety of body systems. They need to describe of each of the following stages:

- Mitosis: interphase, prophase, metaphase, anaphase, telophase, cytokinesis
- Meiosis: prophase I, prometaphase I (importance of crossing over), metaphase I, anaphase I, telophase I, (cytokinesis may or may not occur), prophase II, metaphase II, anaphase II,

telophase II (cytokinesis).

- Gametogenesis – including the named stages of spermatogenesis and oogenesis and the differences between these processes.

Topic 2.3

Learners need to be able to explain how DNA is utilized through protein synthesis including:

- Transcription – covering detail of how helicase unzips the DNA, and polymerase creates mRNA which leaves the nucleus
- Translation – covering the role of tRNA and linking into previous knowledge of the role of ribosomes, RER & SER and the Golgi body.

Learning outcome:

3. Understand the principles of Mendelian inheritance for predicting inheritance

Topics

3.1 The principles of Mendelian genetics and the laws of inheritance
3.2 Gene interactions and their effects on inheritance
3.3 Analysis of breed data using simple probability tests

Topic 3.1

Learners should be aware of the laws of inheritance, to include:

- Mendel's Laws
  - The Law of Dominance: recessive and dominant alleles
  - The Law of Segregation: link back to separation of homologous pairs during meiosis
  - The Law of Independent Assortment: to demonstrate that different combinations of alleles are possible depending on arrangement of pairs during metaphase 1.
- Monohybrid and di-hybrid crosses: to complete Punnett Squares and also design their own and interpret the ratio of offspring produced.

Topic 3.2

Learners should be able to understand possible complications in predicted ratios arising from interactions between genes:

- Gene interactions: to explain more complex genetics with examples in animals, to include
  - Co-dominance (and incomplete dominance) eg in roan cattle
  - Sex-linked (and sex-limited traits) eg haemophilia in Keeshunds
  - Multiple alleles eg in rabbit coat colour
  - Epistasis eg in Labrador coat colour
  - Lethal genes eg in Manx cats.

Topic 3.3

Learners to understand how Chi-squared probability tests can be used on simple animal breeding data to show whether any of these gene interactions could be affecting predicted ratios.

Learning outcome:

4. Understand the structure and function of tissues

Topics

4.1 Structure and function of epithelial tissue
4.2 Structure and function of connective tissue
4.3 Structure and function of muscle tissue
4.4 Structure and function of nervous tissue

This outcome covers the categorising and investigation of 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 relationships between cell types and the functions of the associated tissue should be emphasised eg ciliated cells lining the respiratory tract are able to work together in order to waft mucus containing foreign particles away from the respiratory surface.

Topic 4.1

Learners need to be able to describe, locate and identify the structure and function of simple and stratified epithelial tissue, to include:

- Squamous
- Columnar
- Ciliated columnar
- Cuboidal
- Glandular
- Transitional
- Pseudo stratified
- Stratified epithelial tissue (eg skin).

Topic 4.2

Learners need to be able to describe, locate and identify the structure and function of connective tissues to include:

- Basic structure (cells, fibres and ground substance)
- Loose connective (Adipose, Areolar and reticular)
- Dense connective (Regular, irregular and elastic)
- Specialised connective (Blood, bone and cartilage).

Topic 4.3

Learners need to be able to describe, locate and identify the structure and function of muscle tissue to include:

- Skeletal muscle (sliding filament theory of muscle contraction and fast and slow twitch muscle)
- Smooth muscle (circular and longitudinal)
- Cardiac muscle (intercalated discs).

Topic 4.4

Learners need to be able to describe, locate and identify the structure and function of a neuron to include:

- Cell body, axon, dendrites, terminal endings, myelin sheath, Schwann cells and nodes of Ranvier

- Salutatory conduction of the action potential
- Structure of the synapse
- Difference in structure between sensory and motor neurones
- Monosynaptic and polysynaptic reflex arcs.

Guidance for delivery

This unit is designed to provide the learner with knowledge of the cellular makeup of animal life and how this structure is essential for animal body functions. An understanding of cells, as 'the basic unit of life', will be essential to any career in research or medicine which is increasingly about studying the solution of health problems at a cellular level. The unit should cover a range of species as appropriate to the area of study, with reference to other types of life where indicated in the specification for comparison purposes.

Tutors have many opportunities to deliver the unit using a wide range of learning approaches including lectures, discussions, seminar presentations, laboratory work and independent study. Where laboratory work is used this should be in line with the centre's ethical policies. Tutors should consider integrating the delivery and private study of this unit with other relevant units. The unit "Biological Systems" is recommended to run in parallel, examining the structure and function of whole organ systems. The units "Biochemistry" and "Inheritance and Genetics" are natural extensions of the basic cytology knowledge delivered in this unit, and how this information might be applied in a career in the industry.

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.

Unit 322 Biochemistry and Microbiology

UAN:	Y/507/7170
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to explore key processes that underpin life and investigate the lifecycle, hazards and benefits of a range of microorganisms.

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 wellbeing of all animals. The unit will provide a sound scientific foundation on which further study can be built on. This unit is primarily aimed at learners within a centre-based setting looking to progress into higher education or further training within the sector. It is envisaged that this unit will allow access to higher education courses including veterinary science; bio-veterinary science; animal science; zoology etc. This unit will provide strong fundamentals from which learners can progress to a career in veterinary nursing or into laboratory work.

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.

Learning outcomes

In this unit, learners will be able to

1. Understand 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. Understand the hazards and uses of microorganisms
6. Isolate and classify bacteria

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learners need to cover the following micro-organisms:

- Bacteria
- Virus
- Fungi.

Learning outcome:

1. Understand the principles of biochemistry in relation to cellular structure and function

Topics

1.1 The structure of carbohydrates, proteins and lipids

1.2 The function of carbohydrates, proteins and lipids within an animal.

This outcome will allow the learner to show their understanding and be able 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.

Range for outcome

Carbohydrates – monosaccharides, disaccharides, polysaccharides

Protein – amino acids, peptides, proteins

Lipids – triacylglycerols, fatty acids, cholesterol, phopholipids, waxes.

Topic 1.1

Learners will review the structure of carbohydrates to include:

- Straight chain and ring structure of monosaccharides and condensation reactions to form 1-4 and 1-6 glycosidic bonds
- A combination of monosaccharides to produce common dissaccharides, reducing and non-reducing sugars, structures of glycogen, amylase and amylopectin.

Learners will review the structure of proteins to include:

- Common structure of an amino acid
- The occurrence of condensation to form a peptide bond.

Learners will be able to outline the significance of the 'R' group, and describe the Primary, secondary, tertiary and quaternary structures and the use of hydrogen bonds and disulphide bridges in forming these structures.

Learners will be able to describe the structure of fibrous and globular proteins as well as show understanding in the results of denaturation

Learners will review the structure of lipids to include:

- 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

Topic 1.2

Learners will review the function of carbohydrates to include:

- The function of carbohydrates as energy stores
- The respiratory substrates and as structural components of animal and plant cells and tissues.

Learners will describe the function of proteins and their role as:

- Respiratory substrates
- Storage molecules
- Enzymes
- Transport molecules (within the cell, across membranes and between cells)
- Cell signalling molecules (hormones, receptors and signal transduction)
- Structural components of animal and plant cells and tissues.

Learners will describe the function of lipids and their role as:

- Storage molecules
- Respiratory substrates
- Structural components of animal and plant cells and tissues
- Insulation,
- Protection (eg waterproofing),
- Buoyancy (eg blubber),
- Cell membranes
- Intercellular messengers (eg lipid based hormones).

Learning outcome:

2. Understand the production of Adenosine Triphosphate (ATP) from glucose by aerobic and anaerobic respiration

Topics

2.1 The process of glycolysis, citric acid cycle and oxidative phosphorylation

2.2 Aerobic and anaerobic respiration

This outcome 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

Range for outcome

- 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

Topic 2.1

Glycolysis: The learners will identify the location of glycolysis in the cell. The learners will have an understanding of the principles of energy investment, Adenosine Triphosphate (ATP) including the use/production and final yield.

Learners will have understanding in the significance and production of NADH, pyruvate and water.

Learners will be able outline the changes in chemical structure in terms of changes in the number of carbon atoms and the significance of changes in phosphorylation. Learners will be able to identify the location of the link reaction and explain why it is necessary to form acetyl-CoA from pyruvate

Citric Acid Cycle: Learners will be able to identify the location of the cycle within the entry of acetyl-CoA into the cycle.

The learner will be able to discuss the number of steps involved in each complete cycle and explain 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 learner will be able to locate the cell the electron transport chain and ATP synthase.

The learner will identify the number of protein complexes and have understanding of the significance of redox reactions, the transport of electrons and the movement of protons.

The learner will identify the entry points for NADH and FADH2 and the relative Adenosine Triphosphate (ATP) yields.

The learner will be able to describe the principle of proton motive force and the action of Adenosine Triphosphate (ATP) synthase

Topic 2.2

Learners will compare the ATP yield from each. Learners will be able to outline the method of lactic acid production. The learner will have an understanding of the energetic cost of lactic acid production and the conversion of lactic acid back to glucose. The learner be able to describe the principle of oxygen debt and the detrimental effects of excess lactic acid in animals.

Learning outcome:

3. Understand enzyme kinetics

Topics

3.1 Models of enzyme action

3.2 Types of enzyme inhibition

3.3 The effect of environmental changes on enzyme reaction rates

This outcome 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.

Range for outcome

Action, inhibition and control of enzyme catalysed reaction in eukaryotic and prokaryotic cells

Topic 3.1

The learner will review the Lock and Key and Induced Fit models with reference to catabolic and anabolic enzyme reactions.

Topic 3.2

The learner will show understanding of competitive, non-competitive, reversible and irreversible inhibition and describe their effect on the velocity of enzyme catalysed reactions.

Topic 3.3

The learner will outline the effects on the velocity of enzyme catalysed reactions when variations in pH, temperature, substrate and product concentration are applied.

The learner will be able to explain the effect of denaturation on enzyme activity and identify the causes of denaturation.

Learning outcome:

4. Understand the growth and reproduction of bacteria, viruses and fungi

Topics

4.1 The reproduction of microorganisms

4.2 The growth requirements of microorganisms

This outcome introduces learners to reproduction and growth of bacteria virus and fungi. There will be a degree of formal lectures backed up by practical investigations. The inhibition of bacterial growth may also be incorporated into an investigation of the effectiveness of a range of concentrations of disinfectants or the investigation antibiotics using antibiotic sensitivity testing discs and selective and differential media.

Range for the outcome

Bacteria, fungi and viruses

Topic 4.1

Learners will need to explain the process of:

- Binary fission and conjugation of bacteria
- Typical bacterial growth curve phases

- Asexual and sexual reproduction in fungi
- Viral adsorption, penetration, multiplication and release.

Topic 4.2

Learners will need to outline the environmental factors associated with bacterial growth. These must include:

- Temperature
- pH
- Oxygen requirements
- Nutrition.

Learners will need to describe the use of growth requirements in bacterial selection and identification. These will include:

- Selective agars
- Differential agars
- Staining techniques eg gram staining.

Learners will describe the inhibition and control of bacterial growth. These will include the use of:

- Antiseptics and disinfectants
- Sterilisation (heat, radiation, filtration and chemical)
- Antibiotics, to include mechanisms of control and resistance.

Learning outcome:

5. Understand the hazards and uses of microorganisms

Topics

5.1 Key uses of microorganisms with reference to animal and human health

5.2 The relevance of COSHH legislation with reference to working with microorganisms

5.3 Hazards associated with handling microorganisms

Learners should also have the opportunity to investigate the use of microorganisms 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.

Range for outcome

Bacteria, fungi and viruses

Topic 5.1

Learners will need to describe the use of fungi and bacteria in a range of applications, which may include the following:

- Food technology including the production of alcohol; foods such as cheese and yoghurt; bread; high fructose corn syrup; vinegar; citric acid, silage; haylage.
- Production of pharmaceuticals including antibiotics; amino acids; vitamins
- 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, caecum and large intestine
- The impotance of nitrogen fixation.

Topic 5.2

Learners must outline the Control of Substances Hazardous to Health (COSHH) 2002 and the application to working in a microbiology laboratory. This must include:

- 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 immersion oil and solvents

Topic 5.3

Learners must describe the hazards associated with working with microorganisms and the control methods used to reduce the associated risks. These will include the following

- Infection/zoonosis
- Toxin production
- Environmental contamination
- Spore formation
- Aerosols formation
- Hazards posed by commonly used equipment and chemicals in microbiological examination
  - Naked flames
  - Chemicals eg disinfectants, stains and solvents.
  - Autoclaves
- Procedures applied to prevent or reduce the hazards associated with the handling and analysing micro-organisms
  - Safe disposal of waste material
  - Biological safety cabinets
  - Autoclaves
  - Reduction of aerosols
  - Incubation at lower temperatures to reduce the growth of pathogenic bacteria
  - Not sealing plates completely to avoid anaerobic growth.

Learning outcome:

6. Isolate and classify bacteria

Topics

6.1 Undertake a range of microbiological tests using on a culture of bacteria under aseptic conditions

Learners will be introduced to the principles and practical skills used within microbiology. This Outcome is designed to be delivered through practical microbiological investigations whereby learners acquire the practical skills to isolate, grow, test and identify bacteria. Learners will complete a logbook of a range of bacterial investigations. CLEAPSS provides guidelines for working with microorganisms 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.

Topic 6.1

Learners will obtain a pure monoculture from a mixed culture of two or more species. Learners will produce a log of their own practical work to include the following investigations.

- Streak plate for isolation
- Colony morphology
- Staining techniques eg gram staining.
- Sub culturing
- Selective and differential agars eg blood agar, eosin methylene blue
- Motility test
- Effectiveness of different concentrations of disinfectant
- Antibiotic susceptibility tests.

Guidance for delivery

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 microorganisms 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 and selective and differential media.

For Outcome 6 the learners will explore the range of test regularly used within microbiology in order to grow, isolate, test and identify bacteria. This will be a practically based outcome, learners will be required to undertake a range of tasks and to log the results and conclusions from them.

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.

Unit 323 Dog Grooming

UAN:	D/507/7171
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners 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

In this unit, learners will be able to

1. Understand the use of grooming equipment and maintenance requirements
2. Prepare dogs for styling
3. Remove excess coat by electrical and non-electrical equipment
4. Trim dog's paws and pads

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learners should work with a minimum of two of the following coat types: Wool, wire, silk, double, smooth, mixed.

Learning outcome:

1. Understand the use of grooming equipment and maintenance requirements

Topics

1.1 Types of equipment and their uses

1.2 Methods to maintain equipment

This outcome requires the learner to understand how to use and maintain equipment found in a grooming establishment. 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. This will include cleaning, oiling, sterilizing and storage of non- electrical equipment. Electrical equipment used should be PAT tested as per guidelines.

Topic 1.1

Learners need to identify grooming equipment and explain their uses, to include:

Non electrical: brushes, combs, de-matters, stripping tools, grooming mitts, scissors and thinning scissors

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

Topic 1.2

Learners need to understand how to maintain dog grooming equipment, to include:

Non-electrical: How to remove hair, clean, wash, lubricate, disinfect, sterilise, check it is fit for use, sharpening, storage, health and safety requirements for maintaining the equipment

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, health and safety requirements for maintaining the equipment.

Learning outcome:

2. Prepare dogs for styling

Topics

2.1 Animal health and temperament assessments on dogs in preparation for grooming

2.2 Preparation of dog for styling appropriate to breed coat, style and condition

2.3 Nail and ear care for dogs.

This outcome 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.

Topic 2.1

Learners will need to carry out health and temperament assessments on chosen dogs from the range, to include:

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)
- Recognise breed of dog and temperament.

Topic 2.2

Learners will need to prepare chosen dogs for styling, using methods and techniques appropriate to the breed coat, style and condition. This will include:

- Grooming
- Bathing
- Drying the coat.

Learners may have to remove knots, tangles and dead hair using combs, brushes, scissors or thinning scissors, clippers, by hand and/or stripping tools and/or de-matting tools.

Topic 2.3

Learners will need to identify if the chosen dogs' nails need trimming/ condition. They will need to understand what is a coagulant and how to use it.

Learners will need to clip, clean and remove visible debris from the dogs' ears using approved methods and appropriate equipment.

Learning outcome:

3. Remove excess coat by electrical and non-electrical equipment

Topics

3.1 Remove excess coat using electrical clippers

3.2 Remove areas of excess coat using non-electrical equipment

This outcome requires the learners to remove excess coat both with electrical and non- electrical equipment. 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.

Topic 3.1

Learners will need to remove excess coat using electrical clippers, to include:

- Styling: clipped, parted, scissored, natural
- Condition: normal, healthy, matted, tangled, dread hair.

Topic 3.2

Learners will need to remove excess coat from chosen dogs using non-electrical equipment, to include:

- Scissors
- Thinning scissors
- Stripping tools
- De-matting tools.

Learning outcome:

4. Trim dog's paws and pads

Topics

4.1 Identify paw and pad trimming requirements

4.2 Trim paws and pads

This outcome requires the learner to trim dogs' paws and pads. 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.

Topic 4.1

Learners will need to identify the paw and pad trimming requirements for the chosen dog breeds.

Topic 4.2

Learners will need to trim the paws and pads of the chosen dogs, using appropriate methods and equipment.

Guidance for delivery

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 eg 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.

Unit 324 Science Investigation and Report Writing

UAN:	H/507/7172
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to carry out a scientific investigation and be able to produce a report to discuss its outcomes. It allows the learner to plan, in detail, a scientific investigation using scientific principles whilst collecting and analysing results.

Learning outcomes

In this unit, learners will be able to

1. Plan an investigation relevant to the area of study
2. Undertake the planned investigation using scientific principles
3. Collect, collate and analyse results from the investigation
4. Draw conclusions from the investigation

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Plan an investigation relevant to the area of study

Topics

1.1 Objectives and hypothesis
1.2 Referencing research resources
1.3 Project plan for an experiment

Topic 1.1

Learners need to know the types of investigation, which may include:

- Experimental
- Fieldwork
- Observation.

Learners need to understand how to develop objectives and hypothesis relating to an investigation.

Topic 1.2

Learners need to know the information sources available for scientific investigations and how to reference these sources, which may include:

- Identification, location and extraction of relevant information sources,
- Uses of recognised protocol for recording the sources eg Harvard system
- Assessment of reliability and validity of information researched.

Topic 1.3

Learners need to plan for a scientific investigation, to include:

- Principles of design for investigations
- Details of experimental design and controls
- Formulation of hypothesis
- Statement of proposed analytical techniques to be used
- Assessment of possible errors in practical work.

Learners need to carry out a risk assessment for the scientific investigation, to include:

- Hazards and risks
- Control measures.

Learners need to create a project plan for the scientific investigation, to include:

- Hypothesis
- Objectives
- Milestones
- Resources.

Learning outcome:

2. Undertake the planned investigation using scientific principles

Topics

2.1 Carry out the planned investigation safely

Topic 2.1

Learners need to prepare for planned investigation, which may include:

- Setting up equipment materials
- Selecting Personal Protective Equipment
- Reference to plans and risk assessment.

Learners need to carry out planned investigation using scientific principles, this may include:

- Dexterity skills
- Appropriate use of instruments and techniques for taking measurements
- Observational skills
- Recording results
- Accuracy
- Integrity
- Precision
- Maintenance of working laboratory logbooks and record keeping
- Good Laboratory Practice (GLP)
- Good Clinical Practice (GCP).

Legislation and health and safety requirements must be adhered to during the practical investigation.

Learning outcome:

3. Collect, collate and analyse results from the investigation

Topics

3.1 Record results

3.2 Analyse results

Topic 3.1

Learners need to record results obtained from an investigation, using scientific protocols, which may include:

- Practical data – organisation of data eg class intervals, tallying, methods of data processing - correct units of experimental quantities used, assessment of experimental accuracy and precision.

Topic 3.2

Learners need to analyse results obtained from an investigation, which may include:

- Statistical analysis eg mean, standard deviation, learner's t-test
- Validation of method and results – fitness for purpose of methods used, repeatability, sources

and magnitudes of errors in readings taken

- Assessment of information sources used – relevance to investigation, use of relevant, researched information to support or not support experimental work.

Learning outcome:

4. Draw conclusions from the investigation

Topics

4.1 Conclusions gained from the investigation

Topic 4.1

Learners need to draw conclusions from investigation data and analysis and report on them, which may include:

- Scientific protocol used for report eg structure and format
- Use of correct scientific terminology.

Leaners need to present the data from an investigation with an explanation on the format and method used.

Learners need to present the findings of an investigation, to include:

- Evaluation of results
- Conclusions drawn using scientific principles
- Experimental and literature investigations
- Evaluation of proof or otherwise of the hypothesis stated.

Suggested learning resources

Books

How to do your research project: A guide for students in education and applied social sciences. Thomas, G.
Published by: SAGE Publications Ltd. 2013, 2nd edition ISBN:
1-446-25887-4

Statistics for Ornithologists Fowler, J. and Cohen, L.
Published by: British Trust for Ornithology, 1996. 2nd edition
ISBN: 0-903-79355-5

Writing Scientific Research Articles: Strategy and steps Cargill, M. and O'Connor, P. Published by: Wiley-Blackwell, 2009
ISBN: 9-781405-18619-3

Journals and magazines

Analytical Chemistry Biological
Sciences Review Journal of Biological
Chemistry Journal of Physics
New Journal of Physics New
Scientist

Websites

Creative Chemistry	www.creative-chemistry.org.uk
Institute of Physics	www.iop.org
National Association of Science Writers	www.nasw.org
Practical Chemistry	www.practicalchemistry.org
Royal Society of Chemistry	www.rsc.org
Scientific Journals International	www.scientific journals.org

Unit 325 Pet Allied Services

UAN:	M/507/7174
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to identify the career and employment opportunities within the animal care industry. As part of this unit, learners will be required to understand what is involved in becoming self-employed with a focus on dog walking and pet sitting as examples of small businesses within the industry.

It is important that the learner understands current legislation and Codes of Practice in relation to animal health and welfare.

Learning outcomes

In this unit, learners will be able to

1. Know job roles and career pathways in the pet services industry
2. Understand how legislation and codes of practice impact on job roles within the pet service industry
3. Understand the roles and responsibilities of organisations that are involved in pet services
4. Understand the requirements and responsibilities of the self-employed job roles within pet services

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

This unit allows the learner to explore the various career and employment opportunities available whilst being able to highlight the key legislation to be followed. Learners are to be encouraged to continuously apply the elements of this unit to their previous experience of retail and business management in order for them to develop a varied understanding of the wider industry. It is important that the learners do see the ongoing relevance of legislation to protect the animal, public and the employers and to allow them to expand their knowledge with the potential to set up their own business.

Learning outcome:

1. Know job roles and career pathways in the pet services industry

Topics

1.1 Job roles, career pathways and their requirements

Topic 1.1

Learners need to understand the job roles and career pathways that are available in the pet services industry and their requirements, which may include:

Job roles

- Animal Breeder (to include understanding of pedigrees and cross breeds)
- Animal Groomer (eg Dog groomer, Horse groomer, Sheep/Alpaca shearing)
- Animal Transport (i.e. Vet Trips, Airport taxi)
- Animal Hydrotherapist
- Animal massage
- Animal Showing
- Animal Trainer (eg. work, show, competition, media (movies))
- Animal Behaviourist
- Animal husbandry roles within charities (eg Guide Dogs For The Blind, Hearing Dogs For Deaf People, Dogs For Disabled People, Pets As Therapy, Compassion in World Farming, British Horse Society, Red Wings, Cats Protection, RSPCA, RSPB)
- International Charities (eg World Wild Fund for Nature)
- Animal Rescue (eg Blue Cross, Dogs Trust)
- Animal photographer (portrait or action shots)
- Pet Sitter
- Farming
- Kennel person (eg Boarding kennels, training kennels, quarantine kennels)
- Dog walker
- Dog training in the Armed Forces, Police Force and HM Customs and Excise
- Dog training instructor/ assessor
- Cat Boarding (catteries)

- Stable (groom) person (eg Livery, Training (Racing, Event, Hunting))
- Farrier
- Equine Dentist
- Riding instructor (eg teaching people to ride, BHS instructor/ assessor)
- Riding for The Disabled
- Mounted Police
- Falconry
- Retail (i.e. pet shop, feed merchant)
- Wildlife sanctuary/ rescue (i.e. St Tiggy Winkles).

Requirements

- Training
- Qualifications
- CPD
- Insurance.

Learning outcome:

2. Understand how legislation and codes of practice impact on job roles within the pet service industry

Topics

2.1 Legislation and codes of practice

Topic 2.1

Learner need to understand how the Animal Welfare Act (2006) impacts the pet service industry.

Learners need to understand how other legislations and codes of practice impact the job roles within the pet services industry, which may include:

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- Pet Animals Act 1981 (Pet shop regulations)
- The Abandonment Of Animals Act 1960
- Protection of Animals Act 1911
- The Theft Act 1968, Criminal Damage Act 1971, Animal Act 1971 and the Common Law Duty of Care – Relating to domestic cats and dogs.
- The Horse Passports Regulations 2009
- Farriers (Regulations) Act 1975
- Pet Travel Scheme (i.e. travel requirements and quarantine)
- The Wildlife and Countryside Act 1981
- Dangerous Wild Animal Act 1976
- Highway code (i.e. restraining animals whilst travelling in a car and rules for riding on the road)
- Zoo Licensing Act 1981
- Convention On International Trade In Endangered Species (CITES)
- Health and Safety at Work Act 1974
- Control of Substances Hazardous to Health Regulations (2015)
- Microchipping of Dogs (England) Regulations 2015
- Reporting of Injuries, Diseases and Dangerous Occurrences (2013)

Learning outcome:

3. Understand the roles and responsibilities of organisations that are involved in pet services

Topics

3.1 Organisations in pet services

Topic 3.1

Learners need to understand the roles and responsibilities of a range of pet services organisations in the United Kingdom and how they affect the work of the industry, these may include:

Organisations

- Breed societies and councils, eg The Kennel Club, Governing Body of the Cat Fancy, Fancy Mouse Society, The Rare Breeds Society, International Cat Care, National Chinchilla Society, The Tortoise Club, Budgerigar Society, The Gerbil Society, The Parrot Society, Canary Council, National Council for Aviculture, The Cavy Club
- Welfare organisations eg The RSPCA, National Ferret Welfare Society
- Charities eg The Cat Protection League, The Blue Cross, PDSA, The Dogs Trust, Guide Dogs for the Blind
- Trade Associations eg Ornamental Aquatic Trade Associations, Reptile and Exotic Pet Trade Association

Effects on work of the industry

- Welfare standards
- Codes of Practice
- Breeding requirements
- Licensing
- Audits/ policing
- Registrations/ records.

Learning outcome:

4. Understand the requirements and responsibilities of the self-employed job roles within pet services

Topics

4.1 Requirements of a self-employed business
4.2 Requirements and responsibilities of a dog walker
4.3 Requirements and responsibilities of a pet sitter

This learning outcome will look at the requirements of being self-employed, and the roles and responsibilities of two job roles in the industry that are mainly offered by self-employed businesses; dog walking and pet sitting.

Topic 4.1

Learners need to understand the requirements of a self-employed business, to include:

- Book keeping and accountancy:
  - Tax and National Insurance (declaring self – employment)
  - Record keeping
  - Invoicing and payments

    - Business bank account
    - Preparing pensions for staff (if applicable)
- Outline the business:
    - Type of business (i.e. sole trader/ Franchisee)
    - Bank requirements eg specific accounts, bank loans
    - Obtaining premises
    - Business licenses (i.e. animal boarding, pet shops, breeding)
    - Insurance (self – employed policy and Employer liability to cover employees)
    - Registering business - Business name/ logo, owner details
    - Services offered
    - Service fees and mileage
    - Areas covered/ business location
    - Diary management and booking system
    - Terms and conditions of services including cancellation procedure
    - Contingency planning and Risk Assessments.

Topic 4.2

Learners need to identify the specific laws and laws pending relating to dogs, to include:

- The Control of Dogs Order 1992 (Identification and number of dogs that can be walked at any one time)
- Dangerous Dogs Act 1991 (banned breeds and breed regulations, 2014 amendment)
- The Clean Neighbourhoods and Environment Act 2005 (dog fouling)
- Road Traffic Act 1988 (dogs on roads)
- Dog (protection of livestock) Act 1953
- Compulsory micro-chipping (when will it come into effect, owner's responsibilities) for dogs
- Data Protection Act 1998.

Learners need to describe the roles and responsibilities of a dog walker, these to include:

- Taking animal history and exercise requirements from client
- Assessing dog's behaviour and temperament before and during exercise to establish the exercise plan/ routine eg equipment/ PPE, solitary or social walking
- Basic health checks of dogs before and after exercise
- Having access and use to a vehicle that is fit for purpose and maintained.
- Security of keys and clients house/ personal information
- Safe use of leads, collars, harnesses, head collars etc
- Owning all equipment needed for dog walking (eg spare leads, fresh water for dog and walker, poo bags, treats, suntan cream, hand sanitisers, water bowls, first aid kits) and making sure its fit for purpose.
- Ensuring equipment used is safe and secure (i.e. Leads and cages)
- Maintaining health, welfare and safety of dog(s) at all times
- Walking dogs to client's specifications
- Supply food and water to dog(s) if appropriate.

Learners need to describe the handling and restraining techniques required for walking dogs, to

include:

- Applying equipment and PPE
- Health checks
- Moving and transporting

Learners need to explain the health and husbandry requirements for dog walking, which may include:

- Preventative care – ensuring with clients that all dogs are vaccinated, wormed and de-fleaed
- Life stage of dog –adapting walking routines and locations to dog's life stage, eg bitches in season, age, use
- Provision of food and water
- Signs of health – fitness for walking.

Learners need to outline the risks and hazards for dog walking, to include:

- Risk to dogs
- Risk to person
- Risks from environment/ location of walk.

Topic 4.3

Learners need to describe the role and responsibilities of a pet sitter in relation to a client's property, which include:

- Security of keys and owner's property/ personal information (Data protection Act 1998)
- Staying overnight at the customers property
- Collecting post
- Refilling garden bird feeders
- Putting out and collecting bins
- Watering plants
- Discuss with the owner any other requirements they have (i.e. time spent away from the property in the owner's absence).

Learners need to describe the role and responsibilities of a pet sitter in relation to the client's animal's health and welfare, which may include:

- access to a vehicle that is fit for purpose and maintained (in case of routine or emergency vet trip/ walking a dog in a different location)
- Maintaining the safety and welfare of any animals at all times
- In an animal emergency, act appropriately and within the client's wishes.

Learners need to devise a property details sheet that could be used by a pet sitter for a client's property, to include:

- Name, address and telephone numbers for the customer
- Emergency contacts for the customer whilst away and friend or relative in case owner can't be contacted
- Location of fuse box, stop cock, candles and other storm equipment
- Electrical appliances and operating instructions.
- Who may visit the property in the owner's absence (i.e. cleaner, gardener)
- Vehicles left at the property whilst the owner is away
- Location of burglar alarm and operating instructions

- Emergency numbers for electrician, plumber, builder.

Learners need to devise animal care sheets that could be used by a pet sitter for a client's animals, to include:

- Animal details and medical history
- Routine
- Diet and feeding routines
- Accommodation maintenance
- Exercising (where appropriate)
- Routine/ on – going medication
- Vet contact details
- Insurance details
- Other emergency contacts in case owner is out of the country/ unavailable.

Learners need to outline the risks and hazards for a pet sitter, to include:

- Risks to animals
- Risk to person
- Risks from environment.

Learners need to outline the accidents and emergencies that could be encountered by a pet sitter and how they could be dealt with, which may include:

Property

- Burglary
- Appliance damage or malfunction eg washing machine
- Utilities eg water pipes bursting, gas leak
- Fire

Animals

- Illness
- Death
- Injuries
- Stolen/ missing.

Guidance for delivery

Upon completion of this unit, the learner will be able to understand the processes involved in setting up a business and the importance of declaring self – employment.

The learner will be able to identify possible career and employment opportunities within the animal care industry. Also understand the main laws, legislations and codes of practice in relation to animal health and welfare.

The learner will then explain, and where appropriate, demonstrate the roles and responsibilities of a dog walker and pet sitter.

Suggested learning resources

Books

The Kennel Clubs Illustrated Breed Standards - The Kennel Club
The Official Guide to Registered Breeds
Published by: Ebury press, 4th Edition, 6th March 2011 ISBN -
10: 0091928540
ISBN – 13: 978 – 0091928544

You & Your Dog Taylor, D. and Scott, P.,

Published by: Dorling Kindersley Publishers Ltd, second impression 1989 edition ISBN –
10: 0751302732
ISBN – 13: 978 – 0751302738

Straightforward Guide to Book Keeping and Accounts for Small Business Bannister, T.
Published by: Straightforward Publishing, 2009
ISBN – 10: 1847161146
ISBN – 13: 978 – 1847161147

The Small Business Start – up Work Book Rickman, C, D.
A Step - by – step Guide to Starting The Business You've Dreamed of
Published by: How To Books Ltd, 2005, reprinted 2007 ISBN:
978 – 84528 – 038 – 3

Journals and magazines

World Animals BBC
Wildlife
Your Dog Magazine Your
Horse Magazine Your Cat
Magazine

Websites

The British Horse Society	www.bhs.org.uk
Pet Owners Association	www.pet-owners.co.uk
The Kennel Club	www.thekennelclub.org.uk
Department for Environment, Food and Rural Affairs	www.defra.gov.uk
Cat Protection	www.cats.org.uk
Pet Industry Federation	www.petfederation.co.uk
Governing Body of the Cat Fancy	www.gccfcats.org
Lantra jobs in the land-based industry	www.lantra.co.uk/careers
International Cat Care (formally Feline Advisory Bureau)	www.icatcare.org Pet
Food Manufacturers Association (PFMA)	www.pfma.org.uk
Petsitters Alliance	www.petsittersalliance.co.uk
HM Revenue and Customs	www.hmrc.gov.uk/startingup www.hmrc.gov.uk/sa www.hmrc.gov.uk/nic

Unit 326 Small Animal Rehabilitation

UAN:	T/507/7175
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to gain an introduction into the knowledge and skills required to work in small animal rehabilitation.

Small animal rehabilitation covers physiotherapy and hydrotherapy but may include complementary and alternative therapies such as chiropractics, osteopathy, acupuncture and massage. Consideration are also given to animal behaviour.

This unit mainly covers the treatment of dogs, but could also include other domesticated animals such as cats, rabbits and ferrets. Horses may be used for comparisons.

Learning outcomes

In this unit, learners will be able to

1. Understand the therapies, organisations, job roles and career pathways within small animal rehabilitation
2. Understand legislation, codes of practice and codes of conduct that affect small animal rehabilitation
3. Understand how to communicate with clients and veterinary surgeons to obtain a patient's history
4. Understand how animal characteristics, behaviours and activities can impact rehabilitation therapy
5. Assist with a small animal rehabilitation therapy

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. **Understand the therapies, organisations, job roles and career pathways within small animal rehabilitation**

Topics

1.1 Small animal rehabilitation therapies
1.2 Organisations in small animal rehabilitation
1.3 Job roles and career pathways within small animal rehabilitation

Topic 1.1

Learners need to understand the therapies that are used with small animal rehabilitation, these may include:

- Physiotherapy
- Hydrotherapy
- Complementary therapies eg Chiropractic, osteopathy, acupuncture and massage.

Topic 1.2

Learners need to understand the roles and responsibilities of organisation's involved with small animal rehabilitation, which may include:

- Association of Chartered Physiotherapists in Animal Therapy (ACPAT)
- British Small Animal Veterinary Association (BSAVA)
- Institute of Complimentary Animal Therapies (ICAT)
- Association of Complimentary Animal Therapies (ACAT)
- Animal Health Trust (AHT)
- Canine Hydrotherapy Association (CHA)
- National Association of Registered Canine Hydro therapists (NARCH)
- The Institute of Registered Veterinary and Animal Physiotherapists (IRVAP)
- International Association of Animal Therapists (IAAT)
- The Association for the Scientific Study of Animal and Veterinary Physiotherapists (ASSVAP)
- National Veterinary Accredited Programme (NAVP).

Topic 1.3

Learners need to understand the job roles and their requirements within small animal rehabilitation, to include:

- Responsibilities
- Qualifications
- Affiliation with professional bodies
- Insurance and CPD requirements
- Risk Assessments.

Leaners also needs to know the career pathways within the small animal rehabilitation industry

Learning outcome:

2. Understand legislation, codes of practice and codes of conduct that affect small animal rehabilitation

Topics

2.1 Legislation
2.2 Codes of practice and codes of conduct

Topic 2.1

Learners need to understand legislation that applies to small animal rehabilitation therapy and how it impacts practitioners and treatments, to include:

- Animal Welfare Act (2006)
- The Veterinary Surgeons and Veterinary Practitioners (Registration) Regulations Order of Council (2010)
- Veterinary Surgery (Exemptions) Order 1962
- Dangerous Dogs
- COSHH
- Data Protection
- Plus other legislation that is applicable to animal rehabilitation.

Topic 2.2

Learners need to outline codes of practice and codes of conduct that relate to small animal rehabilitation therapy and how it impacts practitioners and treatments, to include:

- Code of Practice for the Welfare of Dogs (DEFRA)
- Scope of Practice (ACPAT)
- Codes of conduct for any associated professional body.

Learning outcome:

3. Understand how to communicate with clients and veterinary surgeons to obtain a patient's history

Topics

3.1 Referral process from a veterinary surgeon
3.2 Patient history from a veterinary surgeon and a client

Topic 3.1

Learners need to understand the process that a client and patient are referred for treatment by a veterinary surgeon, to include:

- Records
- Legislative requirements.

Topic 3.2

Learners need to understand how to obtain patient history and information from a veterinary surgeon and client that can be used to assist with diagnosis and a treatment plan, to include:

- Health history: age, injuries, illnesses, past treatments, medications, any inherited issues
- Activity/ use: working, breeding, competition, pet
- Daily routines: feeding, exercise, rest periods
- Behaviour and temperament
- Individual characteristics.

Learning outcome:

4. Understand how animal characteristics, behaviours and activities can impact rehabilitation therapy

Topics

4.1 Breed characteristics and breed history
4.2 Hip-elbow scoring
4.3 Use of animal, physical effects and impact on treatments
4.4 Common injuries and major traumas

Topic 4.1

Learners need to describe the characteristics and breed history of commonly kept breeds in the United Kingdom and how they influence the rehabilitation therapy applied. These may include:

- Gundog eg Retrievers, Spaniels, Hunt/Point/Retrieve, Pointers and Setters
- Hound eg Beagle, bloodhound, whippet, greyhound
- Pastoral eg Welsh Border Collie, Old English Sheepdog, Samoyeds
- Terrier eg West Highland Terrier, Scottish Terrier, Jack Russell Terrier, Fox Terrier
- Toy eg Bichon Frise, Kings Charles Spaniel, Pekinese, Pug, Yorkshire Terrier
- Utility eg Bulldog, Dalmatian, Schnauzer, Poodle
- Working eg Bernese Mountain Dog, Newfoundland, Boxer, Siberian Husky, Rottweiler.

Characteristics and breed history

- Size
- Weight ranges and condition scoring
- Typical health problems
- Behaviours eg aggressive, nervous, excitable, territorial/ protective
- Breeding
- Anatomy and physiological design, eg chondroplastic
- Skull structure eg brachycephalic, mesocephalic, dolichocephalic
- Movement and gait.

Influences on therapy

- Diagnosis – typical problems to look for
- Type of treatment – conservative or surgical
- Equipment and techniques used; appropriate modalities and contraindications for each
- Length and frequency of treatment.

Topic 4.2

Learners need to understand the process of hip and elbow scoring a patient and why this important for treatment and diagnosis.

Topic 4.3

Learners need to describe how the use or activity level of a patient can affect the animal's body and impact the treatment given, this may include:

- Low/ medium/ high exercise
- Competition/ breeding/ working/ pet/ retired
- Massage/ mobilisation/ hydrotherapy/ exercise
- Considerations of electrotherapies/medication with competition.

Topic 4.4

Learners need to understand the common injuries and major traumas that are treated in small animal rehabilitation therapy, this may include:

- Strains and sprains
- Impact injuries
- Road Traffic Accidents (RTA)
- Amputations
- Spinal conditions
- Orthopeadic
- Age related.

Learning outcome:

5. Assist with a small animal rehabilitation therapy

Topics

5.1 Assessing a patient for diagnosis and treatment
5.2 Assessing a patient while it is being treated
5.3 Handling and restraining a patient for treatment
5.4 Assisting with a rehabilitation therapy on a patient

Topic 5.1

Learners need to understand how a patient is assessed for diagnosis to include:

- Patient history
- Behaviour
- Movement/ gait
- Physical assessment.

Learners need to understand how the patient diagnosis and assessment is used to decide on treatment plan, this may include:

- Choice of therapy – massage, mobilization, hydrotherapy
- Frequency
- Length of treatment

- Home based exercise programme
- Restrictions on use or activities
- Husbandry advice.

Topic 5.2

Learners need to understand how to assess a patient while it is being treated and what indicators to look for to show that the treatment is beneficial or needs to be terminated or altered. This may include:

- Behavioural
- Physical.

Learners need to understand why behavioural assessments of a patient are important.

Topic 5.3

Learners need to know the equipment and personal protective equipment (PPE) used to handle and restrain patients during treatment, to include:

Equipment

- Leads/ harnesses/ slings
- Boots
- Wheels
- Lifejackets
- Treadmills
- Pools
- Land-based spas
- Electrotherapies
- Land-based equipment (poles, mats, gym balls)

Personal Protective Equipment

- Gloves
- Protective clothing
- Muzzles (for dogs).

Learners need to understand the techniques used to handle and restrain patients.

Topic 5.4

Learners need to assist with a small animal rehabilitation therapy, this could be:

- Massage technique
- Mobilisation – range of motion
- Exercise.

Learners should be supervised and adhere with health and safety legislation and animal welfare legislation throughout.

Learners need to evaluate the therapy used.

Suggested learning resources

Books

Animal Physiotherapy: Assessment, treatment and rehabilitation of Animals. Published by: Wiley-Blackwell, 2007 McGowan, C. and Stubbs, N.
ISBN: 1-405-13195-0

Canine Rehabilitation and Physical Therapy. Millis, D. and Levine, D.
Published by: Saunders, 2013, 2nd edition
ISBN: 1-437-70309-7

Canine Sports Medicine and Rehabilitation Zink, M.C. and Van Dyke, J.B.
Published by: Wiley-Blackwell, 2013
0-813-81216-X

Physical Therapy and Massage for the Dog Robertson, J. and Mead, A.
Published by: CRC Press, 2013
ISBN: 1-840-76144-X

Swim to recovery: canine hydrotherapy healing Wong, E.
Published by: Hubble & Hattie Publishing Ltd, 2011 ISBN: 1-845-84341-0

The Dog Anatomy Workbook: A guide to the canine body. Gardiner, A.
Published by: J.A. Allen, 2014
ISBN: 0-851-31983-1

Journals and magazines

Animal Therapy Media (www.animaltherapymedia.co.uk) Canine

Hydrotherapy (www.k9mazagine.com)

In Practice

Journal of the British Veterinary Association

Veterinary Nursing Journal

Websites

Animal Rehabilitation Centre	www.animalrehabilitation.co.uk
Association of Chartered Physiotherapists in Animal Therapy	www.acpat.org
Association of Complementary Animal Therapies	www.theacat.co.uk
Association of Pet Behaviour Counsellors	www.apbc.org.uk
BSAVA	www.bsava.com
Canine Hydrotherapy Association	www.canine-hydrotherapy.org
Canine Rehabilitation Institute	www.caninerehabilitationinstitute.com
Kennel Club	www.thekennelclub.org.uk
Institute of Complementary Animal Therapy	www.theicat.co.uk
Referrals to hydrotherapy	www.vetsonline.com

Unit 327 Kennel and Cattery Management

UAN:	A/507/7176
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to gain 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. The unit will develop the learners' animal husbandry skills within a commercial environment as well as developing their customer care skills which is vital to such an industry.

Learning outcomes

In this unit, learners will be able to

1. Understand different designs and facilities of kennels and catteries
2. Admit animals to a kennel and cattery and follow administrative procedures
3. Carry out animal husbandry and specialist animal management techniques in a kennel and cattery

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

This unit plays an important role in the running of a kennel and cattery establishment, allowing learners to be able to understanding and demonstrate the working practices of a commercial setting. Learners are to be encouraged to continuously apply the elements from other units, including 301 Principles of Health and Safety and 303 Animal Health and Husbandry, and apply them to the commercial environment.

The following is a guided list of the legislation that applies to the workplace and specifically, the care of dogs and cats. Learners should be able to demonstrate the practical application of the legislation and be able to discuss consequences of such legislation not followed appropriately.

- The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018
- The Animal Welfare Act 2006 (incorporating the Five Animal Welfare Needs)
- The Dogs Act 1871
- Code of Practice for the Welfare of Dogs
- Code of Practice for the Welfare of Cats
- Animal Boarding Establishment Act 1963
- Veterinary Surgeons Act 1966
- Pet Animals Act 1951
- The Dangerous Dogs Act 1991 (amended 2014)
- The Zoonoses Order 1989
- The Health and Safety at Work Act 1974
- The Personal Protective Equipment Regulations 2002
- Control of Substances Hazardous to Health Regulations 2002 (COSHH)
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)
- Clean Neighbourhoods and Environment Act 2005
- Data Protection Act 1998
- National Minimum Wage Act 1998
- Working Time Regulations 1998
- Veterinary Medicines Regulations 2013 (amended)

Centres should be up to date with legislation, policies and codes of practices used within this area for the delivery of this unit.

Learning outcome:

1. Understand different designs and facilities of kennels and catteries

Topics

1.1 Designs of kennels and catteries
1.2 Layout of facilities included in kennels and catteries
1.3 Requirements of the Animal Boarding Establishment Act 1963 and The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018

Topic 1.1

Learners will be able to understand the principles of design for kennels and catteries and make suggestions for improvements, to include:

- Individual kennel designs (single barrack, double barrack, circular, linear)
- Cat pen designs (penthouse, linear)
- Isolation and quarantine sections within the boarding establishment
- Designs of breeding/ rescue kennels and catteries
- Quarantine kennels and catteries (DEFRA authorised quarantine premises)

Learners to consider the needs of the animal, employer, client and inspector when carrying out the design process.

Topic 1.2

Learners need to understand how to layout required facilities found in kennels and catteries and make suggestions for improvement, to include:

- 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.

Topic 1.3

Learners need to understand the requirements of the Animal Boarding Establishment Act 1963 and The Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018

Learning outcome:

2. Admit animals to a kennel and cattery and follow administrative procedures

Topics

2.1 Policies and procedures
2.2 Admission and settling in procedures
2.3 Guidelines for dealing with a customer or animal emergency

Topic 2.1

Learners need to understand the procedures and policies in a kennel and cattery environment for:

- Administration
- Health and safety
- Animal welfare
- Licensing requirements
- Customer service.

This can include:

- 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.

Topic 2.2

Learners need to carry out admission and settling in procedures for dogs and cats being kept in a kennel and cattery, to include:

- Taking information from owners, over the phone/ in person
- Advising owners on the animals stay
- Making the animal comfortable
- Minimising stress
- Meeting the individual needs of the animal, eg elderly, juvenile, ill health, behavioural issues, neutered or un-neutered
- Filling in necessary records
- Vaccination records
- Checking on the animal.

Topic 2.3

Learners need to understand the guidelines and procedures for dealing with a customer or animal emergency, to include:

- Dealing with an injury or death of an animal and how to approach the owner
- First Aid emergencies:
  - 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.

Learning outcome:

3. Carry out animal husbandry and specialist animal management techniques in a kennel and cattery

Topics

3.1 Husbandry schedule for animals in a kennel and cattery
3.2 Typical and atyptical animal behaviour in kennels and catteries
3.3 Breed characteristics
3.4 Specialist animal management techniques in a kennel and cattery

Topic 3.1

Learners need to plan a husbandry schedule for dogs and cats being kept in a kennel or cattery, this may include:

- Feeding
- Cleaning and maintenance of accommodation
- Exercise and enrichment
- Health checks
- Medication
- Completion of records
- Monitoring schedules.

Learners need to monitor a husbandry schedule for dogs and cats being kept in a kennel and cattery. This could be a husbandry plan given to them by the centre, kennel or cattery.

Topic 3.2

Learners need to understand normal and abnormal behaviours of dogs and cats that being kept in kennels and catteries, which may include:

- Fear
- Anger and aggression
- Stress
- Dominance
- Submission
- Contentment/ relaxation.

Learners need to recognise signs of stress in dogs and cats, which may include:

- Physical:
  - Weight loss
  - Change in eating, drinking, urination and excretion
  - Hair pulling/ loss/ over grooming
- Behavioural:
  - Pacing
  - Hiding/ keeping out of sight
  - Vocalisations
  - Aggression.

Learners need to understand how to with animals that are exhibiting signs of stress and atypical behaviour, this should include their own behaviours and body language, so that the situation is not escalated.

Learners need to monitor and record the behaviours of dogs and cats in kennels and catteries.

Topic 3.3

Learners need to identify commonly kept breeds of dogs and cats in the United Kingdom, which may include:

- Dogs
  - German Shepherd
  - Labrador Retriever
  - Golden Retriever
  - Springer Spaniel
  - Cocker Spaniel
  - Border Collie
  - Border Terrier
  - Jack Russell Terrier
  - West Highland White Terrier
  - Staffordshire Bull Terrier
  - Chihuahua
  - French Bulldog

- Cats
  - British short- hair
  - Persian
  - Russian Blue
  - Bengal
  - Maine Coon
  - Siamese
  - Burmese
  - Ragdoll
  - Birman
  - Abyssinian

Learners need to understand the breed characteristics for the commonly kept breeds of dog and cats in the UK and how these can affect the animal's needs and behaviours. Learners to be aware of current breed ownership statistics for dogs and cats, eg through the Pet Food Manufacturers Association and rescue centre statistics for admission, eg Blue Cross.

Learners need to understand how the use or activity of a dog or cat can affect their requirements of a kennel and cattery, to include:

- Use/ activity level
  - Working
  - Agility or high energy competing
  - Breeding
  - Retired
  - Indoor or house pet
  - Guard or protection
  - Assistance animals eg guide dogs, therapy animals

- Requirements
  - Diet
  - Exercise
  - Access to outdoor areas
  - Contact with people
  - Contact with other animals
  - Reason for boarding eg ill health of owners, holiday bereavement
  - Duration of boarding

Topic 3.4

Learners need to carry out specialist animal management techniques in a kennel and cattery, which may include:

- 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
- Providing suitable diets and making decisions and recommendations to change them if necessary

Guidance for delivery

This unit highlights the safe working practices required to be carry out when working in a kennel and cattery establishment. It provides the learner with specific skills required to safely carry out the key processes and procedures needed daily. It will allow the learners to develop their understanding of the requirements of the animal, owner (client), employer and inspector. Full compliance with the Animal Boarding Establishment Act 1963 must be followed throughout, to allow learners to carry out suitable procedures to care of the animals. Although learners will commonly gain employment in boarding kennels and catteries, teachers must also incorporate rescue, breeding and quarantine establishments into their delivery to allow further opportunities for learners.

Outside speakers such as boarding kennel or cattery owners could enhance delivery by speaking to learners about daily protocols and challenges they face. Inviting a local inspector to speak to learners would also be very beneficial. Learners should be encouraged to visit a suitable kennel and cattery establishment. Learners that have carried out work experience placement at a kennels can also share their experiences with peers and be able to evaluate current practices.

Suggested learning resources

Books

Cattery Design: The essential guide to creating your perfect cattery — Key, D.
Published by: David Key Kennel and Cattery Design, 2006
ISBN: 0-953-80021-0

Encyclopaedia of dog breeds — Coile, D.C.
Published by: Barron's Educational Series, Inc., 2005 (2nd edition) ISBN:
0-764-15700-0

FAB Boarding Cattery Manual — Bessant, C.
Published by: Feline Advisory Bureau, 2002. ISBN:
0-953-39421-2

Kennel and Kenneling: A Guide for Professional and Hobbyists — McMains, J.M.
Published by: John Wiley & Sons, 2000 (2nd edition)
ISBN: 1-582-45151-6

Kennel Design: The essential guide to creating your perfect kennels — Key, D. and Bailey, G.
Published by: David Key Kennel and Cattery Design, 2008
ISBN: 0-953-80022-9

Running Your Own Boarding Kennels – The complete guide to kennel and cattery management.
Cavill, D.
Published by: Kogan Page, 2008 (4th edition)

The Complete Cat Breed Book DK Publishing
Published by: Dorking Kindersley, 2013
ISBN: 1-465-40851-7

The Dog: Its behaviour, nutrition and health Case, L.P.
Published by: Wiley-Blackwell, 2005 (2nd edition)
ISBN: 0-813-81254-2

The Domestic Dog: Its evolution, behaviour and interaction with people Serpell, J.
Published by: Cambridge University Press, 1995
ISBN: 0-521-42537-9

The Kennel Club's Illustrated Breed Standards The Kennel Club
Published by: Ebury Press, 2003
ISBN: 0-091-89028-4

The Ultimate Encyclopaedia of Cats, Cat Breeds and Cat Care Edwards, A.
Published by: Hermes House, 2014
ISBN: 1-846-81300-X

Understanding Cat Behaviour Roberts, G.
Published by: CreateSpace Independent Publishing Platform, 2014 ISBN:
1-500-62020-2

What is my Dog Thinking? The essential guide to understanding pet behaviour Bailey, G. Published by:
Hamlyn, 2002
ISBN: 0-600-60423-3

Journals and magazines

Health and Safety at Work magazine www.healthandsafetyatwork.com

Health and Safety Newsletter (HSE) http://www.hse.gov.uk/pubns/books/newsletter.htm

Journal of Veterinary Medicine and Animal Health

Occupational Safety and Health Journal

Websites

Air Pets Quarantine Kennels www.airpets.com/boarding-quarantine-kennels

Animal Medicines Training Regulatory Authority	http://www.amtra.org.uk/
British Safety Council	www.britsafe.org/policy-and-opinion/publications
Data Protection Act 1998	www.legislation.gov.uk/ukpga/1998/29/contents
Department for Environment, Food and Rural Affairs	www.defra.gov.uk
DEFRA authorised quarantine premises	www.gov.uk/government/uploads/system/uploads/attachment_data/file/453890/quarantine -premises.pdf
Governing Body of the Cat Fancy	www.gccfcats.org
Health and Safety Executive – Health and Safety at Work Act 1974	www.hse.gov.uk/legislation/hswa.htm
HM Revenue and Customs	www.hmrc.gov.uk
International Cat Care (formally Feline Advisory Bureau)	www.icatcare.org
International Cat Care cattery design	www.icatcare.org/advice/catteries
Legislation.gov - Animal Welfare Act 2006	www.legislation.gov.uk/ukpga/2006/45/contents
Legislation.gov - Five Animal Welfare Needs	www.legislation.gov.uk/ukpga/2006/45/pdfs/u kpga_20060045_en.pdf
Personal Protective Equipment	www.hse.gov.uk/coshh/basics/ppe.htm
Pet Food Manufacturers Association (PFMA) breed statistics	www.pfma.org.uk/statistics
The Kennel Club – dog breed and health information	www.thekennelclub.org.uk/health

Unit 328 Ecological Concepts and Application

UAN:	J/507/7102
Level:	3
GLH:	60

What is this unit about?

This unit aims to introduce learners to the skills and knowledge needed for ecological concepts and application, and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

The learner will investigate the theoretical concepts of ecology, and consider the practical applications of these concepts in the field. They will plan and carry out ecological surveys of plants and animals and develop their understanding of the behaviour and relationships these reveal.

Learning outcomes:

In this unit, learners will be able to

1. Understand the principles of behavioural ecology for life history strategies
2. Understand the principles of population dynamics and metapopulation theory
3. Plan and carry out ecological surveys for flora
4. Plan and carry out ecological surveys for fauna

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand the principles of behavioural ecology for life history strategies

Topics

1.1 Aspects of behaviour that influence reproductive success

1.2 Relationships between parental investment and breeding systems

Topic 1.1

The learner will understand aspects of behaviour that influence reproductive success, competition, social systems, reproductive (eg maternal, paternal), social, territorial, communication.

Influences on behaviour (eg scales, individuals, species, communities, ecosystems, habitats, nutrient cycles, tropic levels, niches, natural selection mating systems).

Topic 1.2

The learner will understand relationships between parental investment and breeding systems:

- Parental investment:
  - Paternal
  - Maternal
  - Social groups
  - Time
  - Energy
- Breeding systems:
  - Selective (eg social/hierarchy related)
  - Matings (including random or chance)
  - Monogamy
  - Polygamy
  - k-selected and r-selected breeding strategies

Learning outcome:

2. Understand the principles of population dynamics and metapopulation theory

Topics

2.1 The metapopulation cycle

2.2 Habitat fragmentation and local extinction

Topic 2.1

The learner will know the principles of metapopulation theory:

- Factors that influence metapopulations eg Increases and decreases, dissolution, emergence, prey/predator relationship, size, form, resources, demes, fluctuations, environment, predictable changes (eg seasonality), isolation

- Biotic factors eg evolutionary age communities, primary productivity, community structure and competition, fecundity, natality, mortality, immigration, emigration, breeding strategies (r and K)
- Abiotic factors eg growth, dispersion, genetic variability, continuity in time

Topic 2.2

The learner will understand habitat fragmentation and local extinction:

- Human influence:
  - Agriculture
  - Industry
  - Regeneration
  - Urbanisation
  - Leisure use
  - Deforestation
- Non-human influence:
  - Natural disasters
  - Seasonal events

Learning outcome:

3. Plan and carry out ecological surveys for flora

Topics

3.1 Plan a flora survey

3.2 Flora survey

3.3 Potential sources of survey error

Topic 3.1

The learner will plan to survey Flora:

- Objective setting and planning
- Risk assessment
- Selection of appropriate sampling and survey method (eg quadrat, kick, transect)

Topic 3.2

The learner will undertake a survey of Flora:

- Phase 2 surveys
- Species surveys eg: NVC plant surveys.
- Data analysis methods
- Presentation methods eg (written, data, pictorial, graphs, pie chart, basic statistics)

Topic 3.3

The learner will identify potential sources of error:

- Experimental
- Human
- Statistical
- Equipment

Learning outcome:

4. Plan and carry out ecological surveys for fauna

Topics

4.1 Plan a fauna survey
4.2 Fauna survey
4.3 Potential sources of survey error

Topic 4.1

The learner will plan to survey Fauna:

- Objective setting and planning
- Risk assessment
- Selection of appropriate sampling and survey method (eg quadrat, kick, transect)

Topic 4.2

The learner will undertake a survey of Fauna:

- Phase 2 surveys
- Species surveys eg: butterflies, reptiles, newts, birds, bats, mammals
- Data analysis methods
- Presentation methods eg (written, data, pictorial, graphs, pie chart, basic statistics)

Topic 4.3

The learner will identify potential sources of error:

- Experimental
- Human
- Statistical
- Equipment

Guidance for delivery

This unit is designed to enable the learner to investigate the theoretical concepts of ecology, and consider the practical applications of these concepts in the field. They will plan and carry out ecological surveys of plants and animals and develop their understanding of the behaviour and relationships these reveal.

This unit should consider a range of habitats and species (plants, mammals, reptiles, amphibians, invertebrates, birds) and should aim to take advantage of the local biogeography to enable the learner to fully engage with their community's ecology.

Throughout the unit the emphasis should be on the contextualisation of the principles of ecology discussed into real examples to enable the learner to fully engage with the concepts discussed. Safe working practices and compliance with relevant legislation, Codes of Practice and health and safety should be emphasised before and during practical surveying.

Learning outcome 1 encourages the exploration of the principles of behavioural ecology and its impact on reproduction and breeding populations. It should be discussed with reference to local, national and international contexts. Delivery is likely to be formal but should be complimented by, videos and case studies to encourage the learner to contextualise the behaviours discussed.

Learning outcome 2 encourages the exploration of the principles of metapopulation dynamics and should be discussed using relevant specific selected examples. Current and topical issues in metapopulation dynamics and conservation should be emphasised along with key theories eg; island biogeography. Delivery is likely to be formal but the use of case studies is strongly encouraged and should be complimented by site visits, visiting speakers, museums and exhibitions to ensure that the learner is able to contextualise the factors covered

In Learning outcome 3 the learner will develop surveying skills and be provided with opportunities to practise survey techniques for given National Vegetation Classification (NVC) communities. A minimum of two surveys should be completed from at least two habitats using recognised NVC methodology. Learners will be required to plan, undertake and reflect on sampling in reference to method, sources of error, results, conclusions drawn, relevant legislation and health and safety.

Learning outcome 4 continues with development of practical ecological surveying skills. A minimum of two surveys should be completed from at least two taxonomic groups, using industry standard recognised methods in accordance with relevant legislation and licensing restrictions. 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 are expected to have underpinning knowledge in animal and plant biology and should be able to relate this to the populations studied in this unit. This unit aims to build upon foundation knowledge to discover the complex relationships that exist within the natural world and how these influence populations of both plants and animals. Equal emphasis should be placed on the development of practical skills and the necessary knowledge to be able 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 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 habitats to add depth to the learner experience.

Suggested learning resources

Books

Williams, J. 2009 The Complete Textbook of Animal Health and Welfare. WB Saunders: London ISBN: 0702029440

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

Allendorf, F. and Luikart, G. (2007). *Conservation and the genetics of populations*. Malden, MA: Blackwell Pub. ISBN: 0470671459

Begon, M., Townsend, C. and Harper, J. (2006). *Ecology*. Malden, MA: Blackwell Pub. ISBN: 1405111178

JNCC – Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit: Field Manual (Joint Nature Coservation Committee, 1990) ISBN 9780861396375

Krebs, JR Davies, B 1977. Behavioural Ecology : An evolutionary approach. Wiley Blackwell : UK ISBN: 0632035463

Losos, J., Ricklefs, R. and MacArthur, R. (2010). *The theory of island biogeography revisited*. Princeton: Princeton University Press.

MacArthur, R. and Wilson, E. (2001). *The theory of island biogeography*. Princeton: Princeton University Press.

Sutherland W(ed) – Ecological Census Techniques: A handbook, 2nd edition (Cambridge University Press, 2006) ISBN 9780521606363

Wheater, C., Bell, J. and Cook, P. (2011). *Practical field ecology*. Hoboken, N.J.: Wiley

Journals and magazines

Journal of Ecology Ecology

Behavioural Ecology

Sustainable Development

Ecologist

British Wildlife

Websites

CIEEM	**www.cieem.net**
Natural England	www.gov.uk/government/organisations/natural-england
The Ecology Global Network	www.ecology.com
The Natural History Museum	www.nhm.ac.uk
Global Issues	www.globalissues.org.uk
JNCC	www.jncc.defra.gov.uk

Unit 329 Population Surveys, Ecology and Conservation

UAN:	D/507/7090
Level:	3
GLH:	60

What is this unit about?

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

The unit aims to enable learners to explore a range of ecosystems and will allow them to investigate how ecosystems naturally change through time and how they are affected by human activity. Learners will understand how an ecosystem functions and will investigate the roles of different organisms and how these different organisms interact. Learners will also understand the value of the services that ecosystems provide. Learners will also understand how natural resources, species and habitats are protected both nationally and internationally and will investigate a range of current conservation strategies.

The unit also aims to enable learners to be able to identify and conduct surveys of ecosystems, habitats and populations.

The applied purpose of this unit is for learners to develop a sound understanding of the principles of ecology and conservation, and to learn how to accurately undertake field surveys. The new skills and knowledge acquired through this unit will enable learners to both accurately assess the status and condition of habitats and species as well as knowing how such resources would be best protected in the future.

Learning outcomes

In this unit, learners will be able to

1. Understand the principles of ecology and how ecosystems function
2. Understand human impacts on global ecosystems and biodiversity
3. Understand national and international conservation strategies
4. Carry out habitat and species surveys

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand the principles of ecology and how ecosystems function

Topics

1.1 Ecological principles and ecosystems
1.2 Population dynamics and how populations change.
1.3 Predator prey interactions within populations
1.4 Types of evolution within animal populations and classification

Topic 1.1

The learner will understand the ecological principles and ecosystems:

- Definitions
- Levels of organization (cells, tissues, organisms, individuals, populations, communities, ecosystems, biomes)
- Characteristics of major biomes
- Trophic levels
- Energy flow
- Ecological pyramids
- Abiotic and biotic factors
- Food chains
- Food webs
- Niches (carnivore, herbivore, omnivore, generalists, specialists)
- Species adaptation.

Topic 1.2

The learner will understand the 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

- Dispersal
- Breeding strategies (r and k) Concepts of carrying capacity Metapopulations
- Density dependent and independent factors

Topic 1.3

The learner will understand predator prey interactions:

- Relationship types (eg true predation, parasitism, parasitoidism, grazing)
- Hunting strategies
- Predation theories
- Predator and prey density
- Boom-bust cycles
- Life tables and survivorship.

Topic 1.4

The learner will understand evolution and taxonomy:

- Historical development of biota
- Five kingdoms
- Taxonomy
- Species classification
- Concept of a species
- Types of evolution (eg divergent, convergent, parallel, co-evolution)
- Speciation
- Development of the theory of evolution (eg Darwin, Mendel, Wallace).

Learning outcome:

2. Understand human impacts on global ecosystems and biodiversity

Topics

2.1 Changes in global ecosystems
2.2 Global wildlife population fluctuations
2.3 Population changes in ecosystems

Topic 2.1

The learner will understand the reasons for change in global changes in ecosystems:

- Overharvesting of plants and animals
- Introduction of non-native species
- Habitat destruction
- Fragmentation
- Climate change and pollution
- Changing seasons and phenology
- Disease
- Decrease in biological diversity
- Population shifts

- Trends
- Scales
- Individuals
- Species
- Communities
- Changing ecological niches.

Topic 2.2

The learner will understand the reasons for global wildlife population fluctuation:

- Seasonality
- Migration
- Emerging diseases
- Climate change
- Habitat destruction
- Influence of man.

Topic 2.3

The learner will understand population changes in ecosystems.

Learning outcome:

3. Understand national and international conservation strategies

Topics

3.1 National conservation strategies for wildlife and their habitats
3.2 International conservation strategies for wildlife and their habitats

Topic 3.1

The learner will understand the national conservation strategies:

- Relevant legislation and regulations (eg Wildlife and Countryside Act 1981 (+ relevant amendments)
- National Environment and Rural Communities Act 2006
- Conservation (Natural Habitats etc) Regulations 1994
- CRoW Act 2000
- Badger Act
- Marine and Coastal Access Act 2009.

Specific Conservation Projects/Strategies:

- Royal Society for the Protection of Birds (RSPB)
- Wildlife Trusts
- Wild Trout Trust
- Zoological Society London (ZSL)
- Forestry Commission
- National Trust

British Trust for Ornithology (BTO)

- GWCT (Game and Wildlife Conservation Trust)
- Environment Agency
- Local Rivers Trusts.

Species re-introduction/ rehabilitation projects, eg:

- Sea eagle
- Salmon
- European eel
- Water vole
- Beaver
- Grey partridge
- White clawed crayfish
- Capercaillie
- Black grouse
- Large blue butterfly
- Sand lizard
- Short-haired bumble bee

Current agri-environment schemes, landscape scale projects.

Topic 3.2

The learner will understand international conservation strategies:

- Relevant conventions
- Legislation and regulations eg Water Framework Directive, Ramsar, Natura 2000, Habitats Directive and European Protected Species (EPS)
- Birds Directive
- Bern Convention
- Bonn Convention
- Convention on Biologucal Diversity (CBD)
- Convention on International Trade in Endangered Species (CITES)

Current Conservation strategies:

- Charity strategies
- International Union Conservation of Nature (IUCN), endangered species international, Worldwide Fund for Nature (WWF),
- Application of the Convention on International Trade in Endangered Species (CITES)
- UN Convention on Biological Diversity
- British and Irish Association of Zoos and Aquariums (BIAZA)
- Marine Conservation Society (MCS).

Learning outcome:

4. Carry out habitat and species surveys

Topics

4.1 Method to survey habitats
4.2 Habitat survey planning
4.3 Habitat surveying

Topic 4.1

The learner will know the different methods of surveying habitats (eg Phase One Habitat Survey, simplified NVC surveys).

Topic 4.2

The learner will be able to plan and select an appropriate method to undertake a habitat survey:

- Objective setting and planning
- Risk assessment
- Health and safety
- Legislation
- Codes of practice.

The learner will select an appropriate survey method:

- Quadrats
- Transects
- Kick Sampling
- Longworth Trapping
- Pitfall Traps
- Point Counts
- Dung Counts
- Vantage point counts
- Tracks and signs
- Seine netting
- Trapping
- Tow nets
- Quantitative electric fishing
- Connective rod snakes.

Topic 4.3

The learner will be able to carry out a habitat survey and present results.

Guidance for delivery

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. Learners will build their understanding of how ecosystems function and how species interact. They will also investigate the 'species' concept and will learn how species have emerged and diversified to create the current levels of global biological diversity.

The unit should consider a range of species and habitats from both the UK and internationally and learners should be encouraged to develop their understanding of the historic, current and emerging issues facing habitats and species. Learners should then be able to examine a range of strategies at both national and international levels that have been put in place to help safeguard the future of habitats and species. Through the examination of an extensive range of national and global case study examples the learner should be able to appreciate the nature and scale of many of the threats impacting on global ecosystems.

Learners will apply their learning by undertaking a range of habitat and species surveys. Safe working practice, risk assessments and permissions will all be sought and followed at all times.

Learners will learn through formal lectures, site visits with expert guidance, museum visits, in addition to carrying out habitat and species surveys,

Learning outcome 1

Learners will study the underpinning principles of ecology and how ecosystems function. They will investigate how the natural world functions and how species interact. Concepts of energy flow through ecosystems should be investigated and the roles played by different organisms should be examined. The characteristics of the main global biomes and ecosystems should be explored and learners will be encouraged to look at how species and communities of organisms have evolved within different environments through history. Learners will study the natural population dynamics of different species and case studies should be used extensively to illustrate these fluctuations.

Learning outcome 2

Learners will look at how global ecosystems have been damaged, modified, altered by human beings. This part of the unit should give learners the opportunity to examine the nature of changes in global ecosystems and to evaluate the scale of ecosystem change. The impacts of anthropogenic changes can then be studied with a particular focus on the effects on overall biological diversity. Modern concepts such as 'ecosystem services' should be explored to assist the learners appreciation of the value of global ecosystems. This learning outcome could be delivered through group exploration of a range of case studies in addition to lectures and classroom sessions. Visual media such as relevant DVD and video footage could be used to help contextualise learning.

Learning outcome 3

Learners will explore the range of national and international methods of protecting habitats and species. Both legislative measures and specific conservation projects could be explored and the effectiveness of these measures could also be discussed and evaluated, Learners could look at specific case study examples of species and how they are afforded protection both nationally and internationally. This learning outcome could be contextualised by additional guest speakers and site visits and presentations looking at case studies of notable species.

Learning outcome 4

Learners should be given the opportunity to undertake a broad habitat survey that identifies the general habitat types and landscape characteristics of a local area, A Phase One Habitat Survey would be ideal and the resources needed to complete this survey are listed in the suggested learning resources section. In addition, learners should plan and carry out an appropriate survey on a local animal population. An appropriate survey technique should be agreed and health and safety, relevant laws, and codes of practice should be adhered to at all times. By undertaking these surveys learners will gain experience in assessing the status of populations and the type and quality of habitat. The selection of an appropriate survey method should be left at the discretion of each centre but should be a recognised, industry relevant survey technique for the species selected.

Suggested learning resources Books

Conservation and the genetics of populations — Allendorf, F & Luikart, G
Published by: Blackwell Pub., 2007
ISBN: 0470671459

Ecology — Begon, M; Townsend, C & Harper, J
Publsihed by: Blackwell Pub., 2006 ISBN: 1405111178

Ecology: Principles and Applications. 1st ed. Published by: Cambridge University Press, 1998 ISBN: 978052 1588027

Live Trapping Small Mammals. 1st ed. — Gurnell, J & Flowerdew, J
Published by: Mammal Societey, 2006
ISBN: 9780906282540

Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit: Field Manual
JNCC
Published by: Joint Nature Coservation Committee, 1990 ISBN: 9780861396375

Behavioural Ecology : An evolutionary approach — Krebs, JR & Davies, B
Published by: Wiley Blackwell, 1977
ISBN: 0632035463

99% Ape: How evolution adds up — Silvertown, J et al
Published by: Natural History Museum, 2008
ISBN: 0565092316

Ecological Census Techniques: A handbook — Sutherland, W(ed)
Published by: Cambridge University Press, 2nd edition, 2006
ISBN: 9780521606363

Essentials of Ecology, 3rd Edition Townsend, C; Begon M & Harper, J
Published by: Wiley-Blackwell, 2008
ISBN: 9781405156585

Practical field ecology Wheater, C; Bell, J & Cook, P
Publisher: John Wiley & Sons; 1 edition, 2011
ISBN-10: 0470694297
ISBN-13: 978-0470694299

Journals and magazines

Journal of Ecology British

Wildlife

Conservation Land Management

Ecology

BBC Wildlife Birds

Forest Life

Shooting and Conservation

Websites

Natural History Museum	www.nhm.ac.uk
Joint Nature Conservation Committee	www.jncc.defra.gov.uk
Naturenet	www.naturenet.net
Game and Wildlife Conservation Trust	www.gwct.org.uk
Green Facts	www.greenfacts.org/en/ecosystems
IUCN	www.iucn.org
CIEEM	www.cieem.net
Natural England	www.gov.uk/government/organisations/natural-england
The Atlantic Salmon Trust	www.atlanticsalmontrust.org
The Marine Conservation Society	www.mcsuk.org
NASCO – North Atlantic Salmon Conservation Organisation	www.nasco.int BIAZA –
British and Irish Zoo Association	www.biaza.org.uk

Unit 330 Pest and Predator Control

UAN:	T/507/7094
Level:	3
GLH:	60

What is this unit about?

This unit aims to introduce learners to pest and predator control skills and understanding and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

Control of pests and predators is an integral part of good countryside management. The ability to eliminate and deter unwanted animals can benefit natural ecological preservation as well as the man- made environment. The ability to efficiently control pests and predators in accordance with relevant legal obligations is a sought after skill.

Learning outcomes

In this unit, learners will be able to

1. Know the principal UK pest and predator species and their legal status
2. Understand the ecology of common UK pest and predator species
3. Control pests and predators

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Know the principal UK pest and predator species and state their legal status

Topics

1.1 UK pest and predator species
1.2 Tracks and signs of locally occurring pests and predators
1.3 Locally occurring pests and predators
1.4 Level of protection afforded to a range of pest and predator species

Topic 1.1

The learner will know the principal UK pest and predator species, eg:

- Fox
- Badger
- Stoat
- Weasel
- Mink
- Polecat
- Pine marten
- Otter
- Rat
- Rabbit
- House mouse
- Grey squirrel
- Cat (domestic, feral & wild)
- Crow (carrion and hooded)
- Rook
- Magpie
- Jackdaw
- Jay
- Raven
- Buzzard
- Sparrow hawk
- Tawny owl
- Hen harrier
- Goshawk
- Peregrine falcon
- Wood pigeon
- Canada goose.

Topic 1.2
The learner will know the tracks and signs of locally occurring pests and predators eg (as appropriate to the species):

- Faeces
- Footprints
- Homes/nests
- Fur/feathers
- Evidence of kills
- Smell.

Topic 1.3
The learner will know how to survey a areas to identify locally occurring pests and predators:

- Faeces
- Tracks
- Browsing
- Fraying
- Bark stripping
- Ground flora degradation
- Loss of habitat structure
- Road traffic collisions
- Crop damage.

Topic 1.4
The learner will know the level of protection afforded to a range of pest and predator species eg:

- Wildlife & Countryside Act 1981
- Annual General Licence to kill
- Take or disturb birds
- Protection of Badgers Acts.

Learning outcome:

2. Understand the ecology of common UK pest and predator species

Topics

2.1 Ecology of avian pest or predator species
2.2 Ecology of mammalian pest or predator species

Topic 2.1

The learner will understand the ecology of avian pest or predator species:

- Ecology:
  - Life-cycle especially breeding behaviour
  - Distribution and preferred habitats
  - Population status
  - Diet
  - Impact and damage caused as a pest/predator
- Avian eg:
  - Crow

- Magpie
- Buzzard
- Sparrow hawk
- Wood pigeon
- Red kite
- Tawny owl
- Canada geese
- Rooks
- Goshawk
- Jay
- Peregrine falcon
- Jackdaw
- Raven
- Hen harrier.

Topic 2.2

The learner will understand the ecology of selected mammalian pest or predator species:

Mammalian:

- Fox
- Rat
- Badger
- Stoat
- Mink
- Rabbit
- Grey squirrel
- Weasel
- Cats
- Polecat
- Pine marten
- Otter
- Hedgehog.

Learning outcome:

3. Control pests and predators

Topics

3.1 Correct control of pests and predators using lethal methods

3.2 Deterring pests and predators using non-lethal methods

Correct methods must be applied according to any relevant legislation and codes of practice for each control method. Correct methods should also include best practice techniques as undertaken by professional pest controllers and gamekeepers and should include field craft required to improve catch rates.

Topic 3.1

The learner will undertake the correct methods of control pest and predators using lethal method, eg:

- Spring traps - Fenn, Magnum, Kania, and DOC traps plus any other relevant ones listed on the most recent edition of the Spring Traps Approval Order
- Snares - Fox and rabbit
- Live catch traps - Larsen, ladder/crow cage, and mink rafts
- Rodenticides - Any second generation anticoagulant rodenticide approved for use outdoors.
- Metallic Phosphides - Talunex and Phostoxin
- Firearms - Lamping, Sitting-Out, Bolting, Driven, Decoying, Ad hoc shooting
- Domestic animals - Dogs, Ferrets, Birds of Prey.

Topic 3.2

The learner will understand how to deter pest and predators using non-lethal methods eg:

- Exclusion
- Audible
- Visual
- Scent
- Taste
- Electrical
- Diversionary feeding
- Habitat manipulation.

Guidance for delivery

This unit is designed to provide the learner with sound knowledge and skills required to control the effects of vertebrate pests and predators. Throughout the unit, the emphasis should be on safe working and the humanitarian application of effective control techniques. 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.

Learning outcomes 1 and 2 cover the identification and ecology of the common vertebrate pests and predators likely to be encountered in the UK. These will include agricultural pests as well as those pests and predators related to game and wildlife management. The legal status of species is considered, together with the relevant legislation. The basic process of identification using size, colour, signs, and tracks is also covered as well as species ecology, breeding, habitat and populations. Populations of pests and predators on given sites will be determined by surveys. These fundamental elements can then be transposed across all the other related species studied. Deer are not studied in this unit, as this topic is covered in 'Understand Deer Management'.

In Learning outcome 1, learners must be able to identify the main UK pest and predator species either in pictorial form or as physical specimens. They must also be familiar with the tracks and signs of locally common pest and predator species. This knowledge should be used to survey a local area to identify the presence of common pests and predators.

Learning outcome 2 requires learners to explain the ecology of selected avian and selected mammalian pest or predator species. Tutors should identify the species or agree them through discussion with the learners.

Learning outcome 3 looks in more detail at lethal control techniques, the variety of traps and methods available, their specific uses, and related legislative obligations and codes of practice.
The setting and positioning of lethal control methods is covered, and this unit should be delivered in a practical setting. For Learning outcome 3 learners are required to demonstrate an understanding of the correct methods of controlling pests and predators using selected lethal methods. All activities should be completed with regard to the appropriate health and safety risk assessments and practices, and should be consistent with relevant legislation and codes of practice.

Learning outcome 3 also covers the use of non-lethal techniques to prevent damage from pests and predators, and determines their effectiveness. It covers their use and related codes of practice and legislation. This is a vital measure when considering the number of protected species that can have an impact on game and wildlife populations, and the use of deterrents in situations where lethal control is difficult or unnecessary. In Learning outcome 3 learners should be encouraged to review the effectiveness of a range of deterrents in common usage and should demonstrate an understanding of what affects their effectiveness.

Suggested learning resources

Books

Animal Tracks and Signs — Bang, P & Dahlstrom, P.
Published by: Oxford University Press, 2001 ISBN: 0198507963

Animal Traps and Trapping — Bateman, J.
Published by: Stackpole Books. 1982
ISBN: 0811701037

Foxing with Lamp and Rifle — Bucknell, R
Published by Foxearth Publishing, 2001
ISBN: 0954020606

Rabbiting with Ferret, Dog, Hawk and Gun — Frain, S
Published by: The Crowood Press, 2005
ISBN: 978-1861268020

Fox Control — Frain, S
Published by: Quiller Publishing Ltd., 2006 ISBN: 978-1904057819

Practical Pest Control in the Countryside — Hogg, G
Published by: Coch-y-Bonddu, 1998
ISBN: 978-0952851080

Modern Vermin Control, 3rd edition — Roberts, M
Published by: Gold Cockerel Series, 2001
ISBN: 978-0947870041

Websites

The Department for Environment, Food and Rural Affairs	www.defra.gov.uk
Welsh Assembly Government	www.wales.gov.uk
Scottish Executive Environment and Rural Affairs Department	www.scotland.gov.uk
Department of Agriculture and Rural Affairs Northern Ireland	www.dardni.gov.uk
National Gamekeepers Organisation	www.nationalgamekeepers.org.uk
The British Association for Shooting and Conservation	www.basc.org.uk
The Game Conservancy Trust	www.gwct.org.uk

DVD

Trapping Techniques: Part 1 - Moles, Squirrels, Rabbits and Mink, Countryman Pest Control, Steve Caple, 2002

Unit 331 Woodland Habitat Management

UAN:	M/507/7093
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is to provide learners with an understanding of the principles of woodland habitat management 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 aim of this unit is to provide learners with the ability to recognise the features of woodland habitats and the skills required for their management.

Learning outcomes:

In this unit, learners will be able to

1. Understand the historical development of woodland
2. Survey the structures and features within a woodland ecosystem
3. Understand the management of woodland habitats
4. Manage woodland habitats.

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcomes:

1. Understand the historical development of woodland

Topics

1.1 Historical influences that have created the current level of woodland cover in the UK

1.2 The development of woodland types and management systems

1.3 Historic features within woodland

In this outcome learners will explore how woodland management has evolved over the years and be able to explain the development of differing management systems. Learners will be able to identify and compare historic features which may be present and be able to discuss historical features that have shaped woodland cover in the UK.

Topic 1.1

Learners will discuss the historical human and abiotic influences which have shaped woodland cover across the UK including areas such as:

- The Vera Hypothesis
- The ice age
- Wildwood
- Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman,
- Domesday Book
- Middle Ages
- Industrial Revolution
- First World War
- Forestry Commission
- The Second World War
- Post-war destruction 1950s and 60s greening and Forestry expansion including recent community forest initiatives.

Topic 1.2

Learners will understand and categorise woodland types and discuss the development of management systems including succession, National Vegetation Classification (wet woodlands, lowland, upland and scrub communities), ancient woodlands, ancient semi-natural, primary and secondary as well as systems such as coppicing, coppice with standards, wood pastures, pannage and wooded common.

Topic 1.3

Learners will identify and compare any historic features found within woodlands including:

- Woodland name
- Boundary shape
- Wood banks
- Out-grown hedges
- Ditches
- Pits
- Charcoal hearths
- Saw pits
- Tracks
- Indicator species

Learning outcomes:

2. Survey the structures and features within a woodland ecosystem

Topics

2.1 Carry out woodland survey

2.2 Report on structures and features of a woodland ecosystem

2.3 Summarise the ecological importance of a woodland

In this outcome learners will be able to carry out a woodland survey using specific techniques and report on structures and features recorded. Learners will also explore how different woodlands vary.

Topic 2.1

Learners will carry out a woodland survey and record the following data:

- Risk assessment: identification of potential risks and hazards, severity of potential injury (hazard), likelihood of harm (risk), control methods to minimise or avoid risk
- Quantitative data collection (for example quadrats and simple line transects)
- Qualitative data collection (quality of habitat, species distribution)
- Species identification (flora and fauna)
- Stand composition
- Woodland canopy structure
- Abiotic factors influencing species abundance and diversity
- Archaeological and historic features
- Record, map and present information from surveys in various forms (written, data and pictorial) graphs, pie chart and basic statistics etc.

Topic 2.2

Learners will report on the ecological structure of a woodland including ground stand composition, the shrub, sub and upper canopy. Learners will also report on the archaeological and historic features as identified in Topic 1.3 such as woodland name, boundary shape, wood banks, out-grown hedges, ditches, pits, charcoal hearths, saw pits, tracks and indicator species.

Topic 2.3

Learners will summarise the ecological importance of a selected woodland including, main habitat types present. Micro and mosaic habitats, species abundance/diversity and regionally or internationally significant flora and fauna.

Learning outcomes:

3. Understand the management of woodland habitats

Topics

3.1 Different woodland habitats and relevant management techniques

3.2 Equipment and resources for practical management of woodland habitats

In this outcome learners will examine a range of woodland habitats including different techniques employed in their management. Learners will also prepare for the practical management of woodland habitats including equipment and resources.

Topic 3.1

Learners will recognise different woodland habitats including:

- Glades
- Rides
- Woodland edges
- Veteran trees
- Veterinisation
- Deadwood
- Ponds
- Streams
- Bog
- Thicket and dense shade etc.

Learners will also recognise relevant management techniques including areas such as:

- Management plans
- Health and safety
- Planting/sowing (trees, shrubs and ground flora)
- Natural regeneration
- Thinning
- Clearance
- Coppice
- Agroforestry
- Silvicultural systems.

Topic 3.2

Learners will understand both equipment and resources for the practical management of woodland habitats including:

- Personal Protective Equipment (PPE) (eg boots, safety helmet, waterproof clothing and gloves etc.)
- First aid kit
- Planting equipment
- Fencing equipment
- Pruning equipment
- Saw
- Tools for vegetation clearance
- Coppicing tools
- Maintenance (eg cleaning, oiling, sharpening).

Learning outcomes:

4. Manage woodland habitats

Topics

4.1 Recommend improvements to the management of woodland habitats

4.2 Produce method statements for improvements to the management of woodland habitats

4.3 Carry out Practical management of woodland habitats

In this outcome learners have the opportunity to safely carry out practical management of a woodland habitat. Learners will have an understanding of management plans, including suitable aims and objectives and be able to recommend improvements to the management of woodland habitats.

Topic 4.1

Learners will recommend improvements to the management of woodland habitats covering areas such as:

- Increased diversity and habitat creation through ride management
- Scalloping
- Ecozones
- Veterinisation
- Dead wood management
- Invasive species control
- Sustainable management
- Waste management

Topic 4.2

The learner will produce method statements for improvements to the management of woodland habitats

Topic 4.3

Learners will safely carry out practical management of woodland habitats, such as:

- Planting/sowing (trees, shrubs and ground flora)
- Thinning
- Clearance
- Coppice
- Glade creation
- Pond creation
- Dead wood introduction
- Bird boxes
- Bat boxes.

Guidance for delivery

This unit is designed to provide the learner with sound knowledge and skills required to recognise features of woodland habitats and prepare, plan and undertake practical management of woodland habitats. Learners will develop an understanding of the historical influences that have affected woodland cover and understand the range of woodland habitats present today. An understanding of the management techniques available for woodland habitats will be developed along with the opportunity to put some techniques into practice. The unit should cover a wide range of possible activities and potential sites.

Throughout the unit the emphasis should be on safe working and sustainability. 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 importance of sustainable practices should be woven into the delivery throughout.

This unit aims to extend the learners knowledge and skills involved with woodland habitat management. Emphasis should be placed upon the importance of planning and health and safety. 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 woodlands to add depth to the learner experience and put practices into context.

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 activities in different situations that reflect current industry trends.

Suggested learning resources **Books**

Tree Planting and Aftercare: A Practical Handbook — Agate, E
Published by: BTCV, 2001
ISBN: 0946752257

Woodlands: A Practical Handbook — Agate, E
Published by: BTCV, 2002
ISBN: 0946752338

Waterways & Wetlands: A Practical Handbook — Agate, E & Brooks, A
Published by: BTCV, 2001
ISBN: 0946752303

A Handbook of Native Trees and Shrubs — Bedoyere, C
Published by: New Holland Publishers, 2004
ISBN: 1843306069

Portrait of a Woodland: Biodiversity in 40 Acres — Bedoyere, C
Published by: Search Press, 2004
ISBN: 1844480135

Managing Your Woodland for Wildlife — Blakesley, D & Buckley, P
Published by: Pisces Publications, 2010
SBN-10: 1874357455

Ecology and Management of Coppiced Woodlands — Buckley, G
Published by: Kluwer Academic Publishers, 1992
ISBN: 0412431106

Hampshire Countryside Heritage 2: Ancient Woodland — Colebourne, P; Court, N & Howe, J
Published by: Hampshire County Council, 1995 ISBN-10: 0900908750

The Management of Semi-Natural Woodlands — Forestry Commission
Published by: Forestry Commission, 1997
ISBN: 0855382600

The management of semi-natural woodlands: 3. Lowland mixed broadleaved woods — Forestry Commission

Published by: Forestry Commission, 1994

The Management of Semi-natural Woodlands - 1. — Forestry Commission

Lowland Acid and Oak Woods
Published by: Forestry Commission, 2003

Managing Ancient and Native Woodland in England — Forestry Commission
Published by: Forestry Commission England, 2010

Managing Native Broadleaved Woodland — Harmer, R; Kerr, G & Thompson, R

Published by: TSO, 2010 ISBN-10: 011497344X

Wildlife Conservation in Managed Woodlands and Forests. 2nd ed. — Harris, E & Harris, J
Published by: Research Studies Press, 2003
ISBN: 0863802060

The Identification of Soils for Forest Management — Kennedy, F
Published by: Forestry Commission, 2002
ISBN: 0855385596

Woodland Conservation and Management. 2nd ed. — Peterken, G
Published by: Springer, 1993
ISBN: 0412557304

The History of the Countryside — Rackham, O
Published by: J.M. Dent, 1996

ISBN-10: 1842124404

Woodland — Rackham, O
Published by: Collins, New Nauralist, 2006 ISBN-10: 0007481047

Trees and Woodland in the British Landscape — Rackham, O
Published by: Dent, 2010
ISBN-10: 1842124692

Trees and Woodlands in the British Landscape: The Complete History of Britain's Trees, Woods and Hedgerows — Rackham, O

Published by: Orion Publishing, 2001 ISBN: 1842124692

Woodland Habitats — Read, H & Frater, M
Published by: Routledge, 1999 ISBN: 0415180902

Wildlife Rangers' Handbook — Springthorpe, G & Myhill, N
Published by: The Stationery Office Books, 1994
ISBN: 0117103268

Woodland Management - A Pratical Guide — Starr, C
Published by: The Crowood Press Ltd, 2005
ISBN-10: 1847976174

Woodland Rides and Glades: Their Management for Wildlife, 2nd Edition — Warren, M & Fuller, R
Published by: Joint Nature Conservation Committee, 1993 ISBN: 1873701330

Woodland Management and Conservation — Watkins, C
Published by: David & Charles PLC, 1990
ISBN: 0715393294

Journals and magazines

British Wildlife

Quarterly Journal of Forestry

Websites

The Forestry Commission	www.forestry.gov.uk
Natural England	www.naturalengland.org.uk
The Royal Forestry Society	www.rfs.org.uk
The Woodland Trust	www.woodlandtrust.org.uk

Unit 332 Heathland Habitat Management

UAN:	H/507/7107
Level:	3
GLH:	60

What is this unit about?

This unit aims to introduce learners to the skills and knowledge in heathland habitat management and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

The unit ensures that the learner is given the necessary knowledge, experience and management skills to enable them to manage an area of heathland effectively. Assessment methods include the presentation of a management plan, and practical skills assessment.

Learning outcomes

In this unit, learners will be able to

1. Recognise the origins and processes affecting heathland habitats
2. Carry out ecological surveys of heathland habitats
3. Recognise the threats to heathland habitats
4. Know appropriate management techniques for heathland habitats

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Recognise the origins and processes affecting heathland habitats

Topics

1.1 Development of heathlands

1.2 Types of heathland

Topic 1.1

The learner will explain the development of heathlands, eg:

- Plant succession models
- Continuous woodland model
- Formation of podsolic soils
- Plant adaptation to low levels of nitrogen
- Stages of growth for heathers and gorses
- Factors relating to the existence and distribution of heathlands (eg historical, human, agricultural influences).

Topic 1.2

The learner will know the different types of heathland, eg:

- Lowland heath and moorland
- Wet and dry heath.

Learning outcome:

2. Carry out ecological surveys of heathland habitats

Topics

2.1 Indicator species of selected heathland habitats

2.2 Ecological surveys of selected heathland habitats

Topic 2.1

The learner will be able to identify indicator species of selected heathland habitats; as appropriate to habitat, eg:

- Dwarf shrubs
- Gorses
- Mosses
- Grasses
- Bracken
- Semi-aquatic
- Invertebrates
- Amphibians
- Reptiles

- Mammals
- Birds.

Topic 2.2

Learners will be able to complete ecological surveys of selected heathland habitats using appropriate methods present data from surveys in an appropriate form.

Survey type:

- Quantitative (for example quadrats and simple line transects) and qualitative (quality of habitat, species distribution)
- Correlation of species
- Effects of abiotic factors.

Data presentation, eg:

- Written
- Pictoral
- Graphs
- Pie chart
- Basic statistics.

Learning outcome:

3. Recognise the threats to heathland habitats

Topics

3.1 The threats to heathland habitats

3.2 The effects of threats on heathland habitats

Topic 3.1

The learner will know the threats to existing heathland:

- Tree invasion
- Bracken invasion
- Grassland replacing heather
- Unmanaged fire
- Mire drying
- Erosion
- Pollution
- Recreational use (for example walking, horse riding)
- Heathland loss due to road and housing development)
- Relevant legislation to limit the impact (eg; wildlife and countryside act 1981, countryside and rights of way directive 2000, natural environment and rural communities act 2006, the heather and grass burning regulations 2008, designation as sites of special scientific interest, special protection areas).

Topic 3.2

The learners will need to know the impact of these threats to existing heathland species and habitats (eg: damage or destruction of habitats, reduction in species numbers and diversity, loss of rare plants, loss of dependent species, accelerated succession, soil enrichment leading to non-heathland vegetation).

Learning outcome:

4. Know appropriate management techniques for heathland habitats

Topics

4.1 Ecological and cultural objectives for heathland management

4.2 Plan for and carry our practical heathland management

4.3 Evaluate selected practical heathland habitat management

Topic 4.1

The learner will describe ecological and cultural objectives for heathland management:

- Ecological objectives relating to site ecology, (eg; management for selected species of importance, improvements to species biodiversity, objectives for species recovery, heathland restoration, maintaining existing habitat, reducing fragmentation)
- Cultural objectives (eg: relating to landscape character, historical features, archaeology, local community and user interests, cultural and amenity value).

Topic 4.2

The learner will carry out selected practical techniques available for heathland management, eg:

- Scrub control (for example clear trees and scrub, treat regeneration, weed seedlings)
- Grass control (for example scarify, mowing, grazing regimes, stocking rate density, choice of grazing livestock)
- Heather management (for example burning, cut and collect)
- Gorse management (for example coppicing, burning)
- Bracken control (for example use of herbicide, cutting)
- Timing and importance of timing of operations.

Topic 4.3

The learner will evaluate selected practical heathland habitat management (eg; for meeting objectives, for improvements to heathland habitat, for improvements to conservation value, for timeliness of operation, sustainability of working practices, use of safe working practices, cost and funding implications, compliance with regulations) and make recommendations for improving management plans (eg; prioritisation of actions, timing of actions, balancing conflicting requirements, reviewing and recommending alternative management options).

Guidance for delivery

This unit is designed to provide learners with an understanding of the importance of heathland habitats for conservation, their historical development and the careful management required to maintain their characteristics. Learners will also gain the opportunity to develop their practical skills in heathland habitat management.

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. Sustainability concepts should also be demonstrated where possible and practical activities should be planned to minimise disruption to habitats and their species. Whichever delivery methods are used, it is essential that tutors stress that a number of heathland species are protected by law, and that licences from Natural England are required to handle them.

For Learning outcome 1, delivery is likely to be a mix of classroom activity and research relating to the development of heathland. It is anticipated that the ecology of heathland species and the characteristics of different heathland habitat categories will be explored through visits to a range of heathland areas. It is important that learners gain an understanding of the relationship between human activity through the ages and heathland development and distribution.

For Learning outcome 2, The learners need to undertake an ecological survey and identify the key flora and fauna indicator species, development of learners' identification of key elements of heathland species is likely to require learners to practice identifications. Where possible this should be carried out by viewing live specimens in situ, or alternatively using high quality photographs.

For learning outcome 3, learners need to gain an understanding of the potential threats to heathland and their impact. Delivery could be assisted by visits to heathland areas, particularly those where threats or their impact are in evidence. A guest speaker, such as a countryside manager of a heathland area, could explain how they manage the area to mitigate the impact of threats. Learners also need to gain an overview of the relevant legislation and regulations, including the designation of heathland areas as SSSI.

For learning outcome 4, learners will need supervised access to a heathland habitat to carry out practical management activity. Given the careful management planning of most UK heathland, it is important to plan this well in advance to fit with the timing planned by the land owner or managing body. The importance of health and safety should be stressed, as should the importance of minimising environmental impact through the habitat management activities.

Suggested learning resources

Books

The Lowland Heathland Management Handbook — Gimmingham, G
Published by: English Nature, 1993
ISBN: 1857160770

Countryside Conservation: Land Ecology, Planning and Management — Green B
3rd Edition
Published by: Spoon Press, 1996 ISBN: 0419218807

Grasslands, Heaths and Moors — Lane, A & Tait, J
Published by: Hodder Arnold, 1992

ISBN: 0340533706

The Lowland Heath Management Booklet — Michael, N
Published by: English Nature, 1996
ISBN: 1857162668

Lowland Grassland and Heathland Habitats — Price, E
Published by: Routledge, 2002
ISBN: 041518763X

The Wild Flower Key: How to Identify Wild Plants, Trees and Shrubs in Britain and Ireland — Rose, F
Published by: Frederick Warne, 2006 ISBN: 0723251754

Managing Habitats for Conservation — Sutherland, W & Hill, D
Published by: Cambridge University Press, 1995
ISBN: 0521447763

A practical guide to the restoration and management of lowland heathlands — Symes, N & Day, J
Published by: RSPB, 2003 ISBN: 1901930386

New Forest: The History, Ecology and Conservation — Tubbs, C
Published by: New Forest Ninth Centenary Trust, 2001
ISBN: 0952612070

Grazing Ecology and Forest History — Vera, F
Published by: CABI Publishing, 2000
ISBN: 0851994423

Websites

Ashdown Forest www.ashdownforest.org

Department of Agriculture and Rural Development (NI) www.dardni.gov.uk

Department for Environment, Food and Rural Affairs www.defra.gov.uk

Welsh Assembly Government www.wales.gov.uk

Scottish Executive Environment and Rural Affairs Department www.scotland.gov.uk Department of

Agriculture and Rural Affairs (Northern Ireland) www.dardni.gov.uk

Environment Agency www.environment-agency.gov.uk

The New Forest www.hants.org.uk/newforest

Joint Nature Conservation Committee www.jncc.gov.uk

Natural England www.naturalengland.org.uk

UK Biodiversity Action Plan www.ukbap.org.uk

County Wildlife Trusts www.wildlifetrusts.org

Unit 333 Managing Volunteers

UAN:	H/507/7110
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to understand the importance of volunteers to the countryside management sector and to furnish the learners with the skills and knowledge to safely and effectively manage those volunteers.

This unit will explore the importance of volunteers to the countryside management and closely related sectors, examining who they are and what motivates them to volunteer. As a countryside manager learners will need to recruit, maintain, and develop volunteers in a large proportion of the job roles they will be progressing into. The unit will give the learners skills in assessing and developing the skills of volunteers, as well as managing motivation and morale. The unit will also examine the duty of care in regards to health and safety of volunteers, and broader safeguarding issues.

Learning outcomes

In this unit, learners will be able to

1. Understand why and how to recruit volunteers
2. Understand how to support volunteers
3. Understand how to manage volunteers
4. Manage volunteers

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand why and how to recruit volunteers

Topics

1.1 Benefits of volunteering and role of volunteers
1.2 Types of people who volunteer
1.3 Promotion of volunteering
1.4 Recruitment of volunteers

In this outcome learners will understand the value volunteers make to an organisation's goals, the types of people who volunteer and how to recruit volunteers.

Topic 1.1

Learners will understand the benefits of volunteering, both to the individual, to the organisation and to society.

Benefits to the individual include, for example:

- Meeting new people
- Keeping active
- Give something back to society
- Enhance CV
- Value the natural resource
- Learn from experts.

Benefits to the organisation include, for example:

- Access to specialist skills
- Encourage community involvement
- Prioritise workload of employees and increase staffing capacity during periods of high demand.

Learners should also be aware of the importance of communicating the value and contribution of volunteers to other stakeholders within an organisation.

Topic 1.2

Learners will identify attitudes to volunteering and recognize the types of people who volunteer, examining age profiles, motivations, and socio-economic information.

Learners should be aware that there is no age limit to volunteering, although age restrictions may apply to specific activities or situations, particularly with young or vulnerable volunteers.

Topic 1.3

Learners will know the ways of promoting volunteering opportunities, focusing on the advantages and disadvantages of communication methods used to target groups of potential volunteers, for example:

- Volunteer websites
- Use of social media
- Local press and radio
- Stands at trade events
- Word of mouth and paper based marketing (eg, newsletters, adverts, flyers, posters).

Learners should be aware of the importance of presenting a positive image of volunteering, including:

- Promotion of an organisation's commitment towards safeguarding
- Reflecting upon how the ethos of an organisation is being presented.

Learners should also consider diversity consideration to maximize accessibility of volunteering opportunities (eg, language, font siz e, typeface and colours) for a range of potential volunteers (eg, partially sighted, deaf or individuals whose first language is not English).

Topic 1.4

Learners will understand the processes and procedures associated with recruiting and inducting volunteers, including mechanisms to respond to unsolicited enquiries. This will include formal and informal mechanisms for capturing initial information from potential volunteers (eg, application forms, face to face and telephone interviews) and ensuring volunteers are appropriately briefed and aware of their roles and responsibilities (eg, maintaining professionalism, professional boundaries, things to say and not say, reporting of safeguarding concerns, emergency procedures), as well as induction and settling in periods.

Learners will also be familiar with appropriate pre-start checks (eg DBS and List 99 checks), as well as screening of volunteers to identify opportunities and limitations so that volunteers may be allocated appropriate tasks in line with organisational needs and legal considerations (eg, Equality Act 2010).

Learning outcome:

2. Understand how to support volunteers

Topics

2.1 Initial skills assessment of volunteers

2.2 Development of volunteers' skills

2.3 Motivational techniques for volunteers

In this outcome learners will understand how to support, develop and motivate volunteers.

Learners will also understand that some individuals or groups of volunteers need additional support, and will recognise how to identify such additional needs, and potential methods of supporting those needs.

Topic 2.1

Learners will need to identify mechanisms to assess the initial abilities, knowledge and skills of new volunteers (eg, questionnaires, interviews, discussions and trial periods under supervision) in order to allocate appropriate tasks.

Topic 2.2
Learners will understand the importance of the continued development of volunteers and explain how to promote a culture of positive development and learning through the use of reflection and objective constructive feedback.

Learners should be aware of mechanisms to increase knowledge/skills to enable the volunteer to fulfil a job role (eg, internal organisation training, setting of SMART targets, identification of potential external training, job coaches/mentors and regular appraisals/reflections).

Learners should be able to design a skills plan and training log to use in developing volunteers' skills and knowledge further.

Topic 2.3
Learners will understand potential techniques to encourage and motivate volunteers, for example:

- Good communication
- Praise
- Rewards (short term eg tea and biscuits, long term eg christmas party)
- Sense of achievement (eg setting and achieving goals)
- Reflective practice
- Recording volunteer achievements (eg achievement logs/diaries).

Learning outcome:

3. Understand how to manage volunteers

Topics

3.1 Key responsibilities involved in managing volunteers
3.2 Establish working conditions
3.3 Management procedures
3.4 Poor performance

In this outcome learners will understand the legislation, policies, procedures, codes of practice and guidelines in relation to managing volunteers in the workplace. Learners will recognise the difference between volunteers and paid staff, including consideration of volunteer agreements and contracts of employment. They will understand how to establish good working conditions and manage and motivate volunteers to maximize their effectiveness. Learners will also understand how to address poor performance and potential options should the performance of a volunteer not improve.

Topic 3.1
Learners will know the key responsibilities involved in managing volunteers, including:

- The importance of having a clear volunteer policy
- A process for airing grievances
- Appropriate insurance cover
- Meeting legislative requirements (eg Health and Safety at Work Etc. Act 1974, Management of Health and Safety at Work Regulations 1999).

Learners should also be familiar with the differences between engaging volunteers and employees (eg, Working Time Regulations 1998 and National Minimum Wage do not apply to volunteers).

Topic 3.2

Learners will understand how to establish and manage appropriate working conditions for volunteers (eg parking, expenses, provision of work clothing, rest breaks and support facilities (eg kitchen, transport, crèche).

Topic 3.3

Learners will understand procedures to manage the work of volunteers (eg work that is interesting and meaningful, a clearly defined area of responsibility, work which matches the volunteer's abilities as well as the volunteer being involved in planning and organising their own work) and recognise the need to balance managerial, educative and supportive approaches.

Learners will also need to understand the importance supporting the individual (eg acknowledging external pressures and personal circumstances) as well as establishing a positive relationship and developing a spirit of co-operation between volunteers and other staff (eg opportunities to socialise with colleagues).

Topic 3.4

Learners will understand how to recognise and address problems with a volunteer's performance in line with the organisation's policies and procedures.

Leaners should be aware of a systematic approach to managing performance issues, for example:

- The volunteer is made aware of the particular behaviour causing concern
- The consequences of the behaviour (eg for the client, the organisation or the volunteer) are made clear
- The volunteer understands the change expected
- The volunteer has the opportunity to practice the correct behavior.

Learners will know potential options to address issues with a volunteer's performance should it not improve (eg reassign, retrain, revitalise by offering a break from their voluntary work, refer to an external support agency, or ending the relationship between the volunteer and the organisation).

Learning outcome:

4. Manage volunteers

Topics

4.1 Plan volunteer activities
4.2 Lead and supervise volunteers
4.3 Review volunteer performance

In this outcome learners will plan and supervise volunteers undertaking a practical task, subsequently reviewing their performance and providing appropriate feedback. This outcome could be covered by the learner managing a volunteer or group of volunteers to undertake a practical countryside activity, such as pond clearance, building a stile, erecting a fence, planting trees or clearing vegetation.

Topic 4.1

Learners will identify and plan an appropriate and achievable practical countryside activity suitable for volunteers to undertake. Learners are also expected to undertake an appropriate risk assessment, make arrangement for the necessary resources needed to complete the activity to be available and prepare specifications that the volunteers are expected to meet.

Topic 4.2

Learners will lead and supervise volunteers undertaking a practical countryside activity. This will include pre-activity briefing of the volunteers (eg, outcomes from the risk assessment and emergency procedures), allocation of tasks, ensuring volunteers work to the specifications, management of health and safety, motivation of the volunteers, dealing with any problems which arise, as well as minimising pollution and ensuring correct disposal of waste.

Topic 4.3

Leaners will review volunteer performance following completion of a practical countryside activity and provide the volunteers with feedback on their performance. This should be objective and based against the specifications, identifying what went well, what could be improved and how the volunteers could further develop their knowledge and abilities.

Guidance for delivery

This unit examines the role of the volunteer in countryside management, the skills needed to motivate and manage volunteers, and the surrounding legal framework in regards to health and safety and safeguarding. It will be important that delivery relates to example situations that are vocationally relevant to the learners. It is envisaged that this will be a mainly theoretical delivery style, however there is scope for visiting speakers, and site visits to observe volunteer management in action to enhance the relevance of the subject to learners.

Suggested learning resources

Books

A-Z of Volunteer Management — Crooks, B & Mouradian, J
Published by: Llulu.com, 2012
ISBN-10: 1471613895
ISBN-13: 978-1471613890

The Complete Volunteer Management Handbook (3rd Revised Edition) — McCurley, S; Lynch, R & Jackson, R
Published by: Directory of Social Change, 2012 ISBN - 10:1906294607
ISBN-13: 978-1906294601

The New Breed: Understanding and Equipping the 21st Century Volunteer Paperback (New Edition) — McKee, J & McKee, T.W.
Published by: Group Publishing 2012 ISBN-10: 0764486195
ISBN-13: 978-0764486197

Volunteering and Society in the 21st Century — Rochester, C; Paine, A.E & Howlett, S
Published by: Palgrave Macmillan, 2012 ISBN-10: 0230367720
ISBN-13: 978-0230367722

Managing Volunteers: How to Maximize Your Most Valuable Resource — Sakaduski, N
Published by: Praeger Publishers, 2013 ISBN-10: 1440803641
ISBN-13: 978-1440803642

Websites

https://do-it.org/

www.volunteering.org.uk/

www.ncvo.org.uk/ncvo-volunteering

www.volunteering-wales.net/

www.gov.uk/volunteering/find-volunteer-placements
www.volunteernow.co.uk/

www.tcv.org.uk/

www.countryside-jobs.com/volunteers/intro.htm

Unit 334 Fish Biology

UAN:	F/507/7096
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to understand the principles of fish biology 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 understand the anatomy and physiology of fish, how an understanding of behaviour can be applied to fish management and the feeding and nutritional requirements of fish.

Learning outcomes

In this unit, learners will be able to

1. Understand the external and internal anatomy of fish
2. Understand the main processes of fish physiology
3. Understand the main processes of fish behaviour
4. Understand the main processes of fish nutrition

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand the external and internal anatomy of fish

Topics

1.1 External features and function of a fish
1.2 Internal features and functions of a fish

Topic 1.1

The learner will understand the external features of fish and their function:

- Major external features:
  - Skin, fins, eyes, nares, lateral line
  - Types and functions of fish scales
  - Fish ageing from scales, body shapes, changes in external features linked to environment and lifestyle of the fish
  - Basic taxonomic classification of fish.

Topic 1.2

The learner will understand the main internal organs of fish and their function:

- Position and function of internal organs:
  - Reproductive, digestive, osmoregulatory and circulatory
  - Normal or abnormal condition of internal organs
  - Skeleton of teleost fish.

Learning outcome:

2. Understand the main processes of fish physiology

Topics

2.1 Function of physiological systems and sensory organs
2.2 Impact of environment on the physiological systems of fish

Topic 2.1

The learner will understand the main physiological systems and sensory organs of fish to include:

- Circulatory
- Digestive
- Endocrine
- Reproductive
- Immune and nervous systems and osmoregulation
- Respiration and excretion.

Topic 2.2

The learner will understand the impact of the environment on the physiological systems of fish eg:

- Temperature
- Water quality
- Stress
- Angling pressure.a

Learning outcome:

3. Understand the main processes of fish behaviour

Topics

3.1 Normal behaviour in fish

3.2 Abnormal behaviour in fish

Topic 3.1

The learner will understand normal behaviour in fish, including:

- Swimming
- Feeding
- Display
- Breeding
- Escape response.

Importance in relation to fish health and welfare issues; behaviour seen at points within the life cycles of fish.

Topic 3.2

The learner will understand abnormal behaviour and the causes that lead to abnormal behaviour, eg:

- Presence of predators
- Ill health
- Water quality
- Remedial action to alleviate abnormal behavior
- Significance of abnormal behavior.

Learning outcome:

4. Understand the main processes of fish nutrition

Topics

4.1 Principles of fish nutrition

4.2 Fish feeding regimes

Topic 4.1

The learner understand the main components of fish nutrition and their roles:

- Proteins
- Fats

- Carbohydrates
- Vitamins and minerals
- Symptoms of deficiencies and excesses
- Factors influencing the nutritional requirements and how they change with the fish and environmental conditions.

Topic 4.2

The learner will understanding the fish feeding regimes and how they are developed. The learner will assess the efficiency of food usage and know methods used to produce fish food.

Guidance for delivery

On completion of this unit, the learner will have developed an understanding of the biology of fish, through knowledge of their structures and physiology. Learners will be able to apply this knowledge to inferences on the health and wellbeing of the fish and their husbandry and management. Therefore, it is important that delivery relates to species that are vocationally relevant to the learners- eg aquaculture and ornamental species. Many aspects of the content will benefit from practical demonstration and exploration such as scale reading, dissections and behavioural observations. It is likely that learners will also need to undertake independent study and research. Visiting expert speakers could add to the relevance of the subject for learners. For example, a fishery, fish farm or aquarium manager or aquarist could talk about their work and how knowledge of fish biology is essential to their job.

Learning outcome 1 requires the learner to identify the main internal and external structures of fish and their basic function. Learners will become aware of the major anatomy, how it differs between fish species and how these relate to their lifestyle and environment. They will also learn to recognize and distinguish healthy and unhealthy features. It is expected that leaners will have opportunity to practically age fish and carry out dissections in order to identify internal and external structures.

Learning outcome 2 requires the learner to develop a deeper understanding of how the function and physiology of the features and structures identified in learning outcome 1. They will recognize normal physiological processes and the implications if normal functioning is not maintained.

Learning outcome 3 covers the importance of recognising normal and abnormal fish behaviour. It would be expected that direct observations of fish displaying a variety of behaviours would form part of the delivery of this learning outcome as well as formal lectures and discussions.

Learning outcome 4 looks at the principles of nutrition and the appropriate diets for a variety of fish species and should consider the feed requirement for a minimum of 3 different species from at least 2 different situations eg: farmed fish, aquarium kept fish. Learners will become aware of the formulation of diets but also how these diets may be delivered to the fish in the best way. Learners may have the opportunity to formulate and produce their own diet and develop the optimal feeding strategy for a food.

Suggested learning resources

Books

The Interpet Manual of Fish Health Published by: Interpet Publishing, 2002 ISBN: 1842860674	Andrews, C; Exell, A & Carrington, N
Biology of Fishes Published by: Barton, 2nd Edition, 1996 ISBN: 9780120798759	Bond, C. E.
Biology of Fishes Published by: Taylor & Francis, 3rd Edition, 2005 ISBN: 0412741130X	Bone, Q & Moore, R
Handbook of Fish Biology & Fisheries, Volume 1, Chapter 4: The Physiology of Living in Water Published by: Blackwell Scientific ISBN: 9780632054121	Brix, O

The Physiology of Fishes — Evans, D. H. & Claiborne J.B. (Eds.)
Published by: CRC Press, 4th Edition, 2013
ISBN: 9781439880302

Fish Nutrition — Halver, J.E & Hardy, R. W.
Published by: Academic Press, 2002 ISBN: 0080494927

Diversity of Fishes — Helfman, G. S; Collette, B. B; Facey, D. E
Published by: Blackwell Scientific, 2nd Edition, 2009
ISBN: 978-1-4051-2494-2

Environmental Biology of Fishes — Jobling, M
Published by: Chapman & Hall, 1995
ISBN: 0412580802

Nutrition and Feeding of Fish — Lovell, T
Published by: Kluwer Academic Publishers, 2nd Edition, 1998
ISBN: 978146149093

Fishes. An Introduction to Ichthyology — Moyle, P. B & Cech, J. J
Published by: Prentice Hall, 1996
ISBN: 9780131008472

Methods for Fish Biology — Schreck C. B & Moyle P.B
Published by: Amer Fisheries Society, 1st Edition, 1990 ISBN-10: 091323558X
ISBN-13: 978-0913235584

Journals and magazines

Anglers Mail
Angling Times FISH

magazine

Journal of Applied Ichthyology

Journal of Fish Biology

Journal of Fisheries Management and Ecology

Progressive Fish Culturists

Salmon and Trout

Websites

Department for the Environment, Food and Rural Affairs	www.defra.gov.uk
Environment Agency	www.environment-agency.gov.uk
Centre for Environment, Fisheries & Aquaculture Science	www.cefas.defra.gov.uk/
Online fish species database	www.fishbase.org
The Institute of Fisheries Management	www.ifm.org.uk
Ornamental Aquatic Trade Association	www.ornamentalfish.org
Salmon and Trout Association	www.salmon-trout.org

Unit 335 Environmental Interpretation in the Land- based Sector

UAN:	Y/507/7105
Level:	3
GLH:	60

What is this unit about?

This unit aims to introduce learners to environmental interpretation skills and understanding and how this can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

Learning outcomes:

In this unit, learners will be able to

1. Understand the role of environmental interpretation and media
2. Produce an interpretive plan for a site
3. Design a relevant piece of themed environmental interpretation
4. Understand how to evaluate the effectiveness of environmental interpretation

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand the role of environmental interpretation and media

Topics

1.1 Environmental interpretation

1.2 Use of media to interpret sites

Topic 1.1

The learner will understand the aims, purpose and benefits of environmental interpretation:

- Origination of concept of interpretation
- Principles of interpretation eg tilden's six principles, beck and cables principles reasons for interpretation
- Differences between interpretation and instruction
- Types of audience eg captive, noncaptive, age, background, interests
- Setting eg example country park, nature reserve, reservoir, nature walk, forest, botanical gardens, zoo.

Topic 1.2

The learner will understand media that can be used to interpret selected sites:

- Guided interpretation eg guided trails, tours, talks, demonstrations, video production, role play, living history demonstrations, puppet shows, use of visual aids
- Self-guided interpretation eg interpretive panels and boards, indoor and outdoor exhibits, signage, information centre, audio headsets, guide books, leaflets, maps, touch tables, dvds, photographs
- Reasons for using guided or self-guided interpretation methods.
- Use of social media eg blogs, forums, twitter, apps

Learning outcome:

2. Produce an interpretive plan for a site

Topics

2.1 Interpretive planning

2.2 Effective environmental interpretation planning

Topic 2.1

Learners will carry out interpretive planning:

- Planning interpretive objectives; typical visitor numbers and profile eg age, interest, prior knowledge, language, educational level, reason for visiting, group sizes and dynamics
- Gathering data
- Planning interpretation to meet the needs of different visitor types

- Selection of appropriate media, consideration of accessibility and relevance to setting
- Planning guided and self-guided interpretive activities eg script/talk/story board, walks/trails, interactive media eg content, location and layout, planning themes
- Importance of selecting themes, identification of themes, use of thematic map in planning walks/trails, using themes for verbal and written media
- Meeting health and safety requirements

Topic 2.2

Learners will know features of effective environmental interpretation planning:

- Features of self-guided interpretation: appropriate content, use of design principles, organisation and layout eg size of text, text style, pictures and photographs, colour, interactive features, construction materials, health and safety considerations
- Features of guided interpretation: organisation of content, presentation skills, use of audio visual aids, use of props and resources, clarity of presentation

Learning outcome:

3. Design a relevant piece of themed environmental interpretation

Topics

3.1 Effective themed environmental interpretation

3.2 Carry out themed environmental interpretation

Topic 3.1

The learner will use Learning outcome 2 to understand the processes that make an effective piece of themed environmental interpretation.

- Effective: meets objectives for interpretation, conveys environmental information in an interesting, relevant, enjoyable and organised way, accessible for all visitors (physically and conceptually), meets safety requirements, within budget

Topic 3.2

The learner will carry out a themed environmental interpretation eg storyboard, poster, website, guided walk, audio guide

Learning outcome:

4. Understand how to evaluate the effectiveness of environmental interpretation

Topics

4.1 techniques used to evaluate d environmental interpretation

4.2 environmental interpretation evaluate

Topic 4.1

The learner will understand techniques used to evaluate selected environmental interpretation, through gathering information:

- Self-evaluation eg using criteria, checklist
- Evaluation by others eg questionnaire, interview, observation, direct and indirect questioning, open and closed questions, scoring and grading

- When to carry out evaluation eg before, during and after interpretation
- How to us evaluation to suggest recommendations and improvements

Topic 4.2

Learners will know what should be consider when evaluating environmental interpretation.

- Meeting objectives
- Conveying environmental information in an interesting, relevant, enjoyable and organised way
- Accessibility for all visitors (physically and conceptually)
- Meeting safety requirements
- Cost effectiveness
- Management implications
- Sustainability

Guidance for delivery

This unit introduces learners to the principles and benefits of environmental interpretation, and enables them to develop practical skills in planning, carrying out and evaluating environmental interpretations.

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. Sustainability concepts should also be demonstrated where possible.

For Learning outcome 1 delivery is likely to include visits to a range of settings to enable learners to witness the plethora of environmental interpretive media and techniques in operation. Some classroom based and research activity is also anticipated, to enable learners to understand the concepts of interpretation and how it differs from instruction. A guest speaker involved in leading environmental interpretation would also help students to gain an understanding of the elements of planning involved.

For Learning outcome 2 learners will need to produce and interpret plans for a given site.

For Learning outcome 3 learners need to have the opportunity to develop practical skills in producing environmental interpretations. Learners will need to have supervised practice in developing the skills in leading a guided interpretation, as well as the construction skills in creating a self-guided one. Delivery will also need to include consideration of themes, their importance and how they can be determined. It would be helpful for this to be delivered after the visits for outcome one have taken place, so that learners have an understanding of the types of media and their relative advantages and disadvantages.

For Learning outcome 4 learners will need to gain skills in evaluating environmental interpretation, which may include classroom based delivery and discussion. It will be most helpful if learners have the opportunity to practice evaluation of professionally produced materials, those of other learners and their own. This will enable valuable evaluative skills to be effectively developed.

Suggested learning resources

Books

Interpretation for the 21st Century: Fifteen Guiding Principles for Interpreting Nature and Culture
Beck, L & Cable, T
Published by: Sports Publishing, 2002 ISBN:
1571675221

A Sense of Place: An Interpretive Planning Handbook — Carter, J
Published by: Tourism and Environment Initiative, 1997

Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets — Ham, S
Published by: Fulcrum Publishing, 1993 ISBN:
1555919022

Museums and Their Visitors — Hooper–Greenhill, E
Published by: Routledge, 1994
ISBN: 0415068576

Explaining our World: Guide to Environmental Interpretation — Pierssene, A

Published by: Taylor and Francis, 1998
ISBN: 0419219404

The Passionate Fact: Storytelling in Natural History and Cultural Interpretation — Strauss, S
Published by: Fulcrum Publishing, 1996 ISBN: 1555919251

Interpreting our Heritage — Tilden, F
Published by: University of South Carolina Press, 1970 ISBN: 0807840165

Interpretive Master Planning — Veverka, J
Published by: Verulam Publishing, 1994 ISBN: 1560442743

Websites

Association for Heritage Interpretation	www.heritageinterpretation.org.uk
National Association for Interpretation	www.interpnet.com
Scottish Interpretors Network	www.scotinterpnet.org.uk
Zoolex Zoo Design Organisation	www.zoolex.org

Unit 336 Saltwater Captive Environments

UAN:	R/507/7250
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for the learners to develop knowledge and skills that will allow them to maintain and evaluate saltwater organisms in a captive environment

As potential or current fish keepers understanding the environment that a marine fish or invertebrate needs in captivity to not only survive but thrive is of key importance. This unit will help the learner to understand and interpret the scientific background to decisions that they make not only when setting up a tank and adding fish, but also through their life span. They will delve into dedicated marine topics such as, fish and invertebrate specialists, the mechanics of marine aquarium equipment, water quality parameters, live food culture and of course the practical management and of an environment itself.

Since many public aquaria and aquatic shops house medium to large marine species a learning outcome surrounding education has been included to encourage the learner to think about responsible signage and conservation messages they can help to spread in combination with displays.

Learners will not only be able to critique their own aquascaping work against other displays, in terms of aesthetics but also in regards to legislation ensuring animal welfare and health and safety of all involved are of up most importance.

Learning outcomes:

In this unit, learners will be able to

1. Understand the requirements of marine aquatic organisms, including specialist adaptations
2. Understand the suitability of fish and invertebrate species to be kept in a saltwater environment
3. Know the principles of live food culture for saltwater fishes
4. Design, maintain and critique an environment suitable for selected saltwater organisms
5. Understand the use and construct of public aquaria and aquatic shops education

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand the requirements of marine aquatic organisms, including specialist adaptations

Topics

1.1 Marine water quality
1.2 Specialist saltwater species adaptations
1.3 Invertebrates: identification of common ornamental invertebrate species and husbandry considerations

This learning outcome focuses on the marine environment and the adaptations that invertebrates and fish use to survive and excel.

Topic 1.1

The learner will understand the effects that marine water quality parameters can have on captive marine fish and invertebrates and how to manage them optimally:

- pH
- Water hardness
- NH_3
- NO_2
- NO_3
- PO_4
- O_2
- CO_2
- Ca
- Mg
- K
- Salinity/specific gravity
- Micro and macro elements.

Topic 1.2

The learner will understand how to outline form and function of specialist invertebrate anatomical features:

- Radula and exoskeleton.
- Beak, Iridophores/chromatophores, feet suckers of cephalopod,
- Elasmobranch features including Leydig and Epigonal organ, Spiracles, Intestinal valve, Dermodenticles, Ampullae of Lorenzini.
- Lure of frogfish
- Hydrostatic skeleton of starfish
- General anemone and coral polyp anatomy including zooxanthaelle and nematocysts

Topic 1.3
The learner will know common invertebrates including gross structure, defence and feeding functions and how these impact on husbandry. To include:

- Peacock Mantis shrimp (*Odontontodactylus scyallarus*)
- Blue legged hermit crab (*Clibanarius tricolor*)
- Feather duster worm (*Sabellastarte sp*)
- Bubble Coral (*Plerogyra sinuous*)
- Ricordea (*Ricordea florida*)
- Tridacna clams (*Tridacna sp*.)
- Turbo snail (*Turbo Spp*.)
- Rose anemone (*Entacmaea quadricolor*)

Learning outcome:

2. Understand the suitability of fish and invertebrate species to be kept in a saltwater environment

This learning outcome focuses on the choice of fish and invertebrates and how it can impact positively and negatively on a display and the organisms themselves.

Topics

2.1 Characteristics and compatibility of different organisms
2.2 Problems caused by unsuitable environments for fish and invertebrates

Topic 2.1
The learner will know marine fish and invertebrate stocking numbers for shoaling, predatory, and solitary species, compatibility between species, create a mixed community tank using species that fill all levels of the display.

Topic 2.2
The learner will understand problems caused by unsuitable marine environments; Fish:

- Overcrowding
- Incorrect water quality
- Incorrect photoperiod
- Incorrect sex ratio
- Incorrect species compatibility.

Invertebrates:

- Incorrect mineral balance
- Incorrect temperature
- pH
- Alkalinity
- Incorrect illumination
- Incorrect depth and flow

Learning outcome:

3. Know the principles of live food culture for saltwater fishes

This learning outcome focuses on a selection of live food organisms and how to culture them.

Topics

3.1 Marine and brackish live foods
3.2 Benefits and drawbacks of feeding live food
3.3 Culture, maintain and harvest a marine algae species, Rotifer sp., Artemia sp and a copepod sp.

Topic 3.1

The learner will know (and where possible sex) live food either via naked eye and/or under a microscope. This must include:

- Marine algae species - Isochysis galbana and Nannochloroposis oculata
- A marine/brackish Rotifer species - *Brachionus plicatilis* "L"strain
- Artemia salina at all life stages
- A calanoid marine rotifer species such as Arctodiaptomus salinus

Topic 3.2

The learner will know the feeding of live food; nutritional composition, feed stimulus, gut loading, size and species variation, difficulty of culturing organisms, space utilisation, water pollution, pathogen transfer and cost.

Topic 3.3

The learner will design set ups for non-continuous culturing and harvesting of:

- Nannochloroposis oculata
- Brachionus plicatilis "L"strain
- Artemia salina
- Arctodiaptomus salinus

Learning outcome:

4. Design, maintain and critique an environment suitable for selected saltwater organisms

This learning outcome focuses on the actual design, equipment and set up of the tank itself, ensuring that learners can evaluate their work.

Topics

4.1 Marine equipment mechanics
4.2 Set-up of basic marine tank

Topic 4.1

The learner will know a range of aquarium equipment, its function and how it can be used to best advantage. To include:

- Lighting - LED, Halide, and fluorescent lighting (spectrums and intensities)
- Filtration - internal and external filters (mechanical, biological and chemical filtration), sumps and refugiums, UV sterilisation, Calcium reactors, Phosphate removers, Protein skimmers, Fluidised sand beds, Trickle towers, Ozonisers link to redox monitors and controllers
- Heating/chilling systems

- R.O unit
- Artificial/natural salt mixes
- Automatic top up systems
- Wave makers

Topic 4.2

The learner will be able to undertake the set-up of a basic marine tank and centralized aquatic shop marine system;

- Assess its hypothetical effectiveness for species selection
- Welfare
- Health and safety
- Aesthetic design.

Learning outcome:

5. Understand the use and construct of public aquaria and aquatic shops education

Topics

5.1 The importance of signs and education in aquatic shops and public aquaria
5.2 Key points for a customer/visitor on an aquatics shop sign and public aquaria exhibit signs
5.3 innovative/inventive education strategy to promote sustainability in elasmobranchs in public aquaria

This learning outcome focuses on the signage and education linking to conservation and responsible ownership in both public aquaria and also an aquatic shop setting

Topic 5.1

The learner will consider learning styles and abilities and how these impact on the public's views and actions;

- Why signs are important in shops and aquaria
- Dissemination of visitor information
- Species selection (responsible buying and selling)
- Customer retention; legislation (eg equality act); institution/shop reputation
- Role of zoo's and zoo licensing act
- For aquatic shops and oata code of conduct

Topic 5.2

The learner will Identify key elements of signage for public aquaria:

- Species common and scientific name
- Iimage of the animal
- Habitat and range
- Conservation status (Red List and CITES)

Identify key elements of signage for aquatic shops:

- Species common and scientific name
- Image of the animal
- Compatibility of the animal (behaviour/feeding strategy)
- Adult size
- Water quality preferences, cost

Topic 5.3
The learner will be able to identify the main problems elasmobranchs face in the wild (eg fining, habitat loss and bycatch), use innovative/inventive education strategy to promote elasmobranch sustainability to formal and non-formal groups in public aquaria.

Guidance for delivery

On completion of this unit the learner will have a broad knowledge of both fish and invertebrates in a marine captive environments as well produce live food and formulate educational ideas for displays.

This unit is best taught in combination with 'Aquatics Husbandry and Welfare'as this unit will give the student the overall knowledge of aquarium systems as well as specialising in marine environments.

Learning outcomes 1-2 can be developed completely in the classroom but would benefit from practical elements such as water testing and seeing animals use adaptations in different captive environments.

Learning outcome 3 can be taught using photographs and videos, however it would be advantageous to students to be able to set up the given species cultures as this will allow for a greater understanding of the 'quirks' of live food culture. This can be done in groups.

Learning outcome 4 does not need to involve the learner setting up a marine tank from the outset but they must have access to a display that allows them to maintain it. Visits to marine specialists will help learners to formulate designs for their aquascaping.

Learning outcome 5 should include visits to aquatic shops and public aquaria to experience the range of signage and educational activities on offer. This could encourage greater class debate about which method is best to inform which group of visitors/buyers. If trips cannot be planned the teacher must have a portfolio of signage and educational examples to show the students to ensure they are exposed to range of designs to formulate their own ideas. Again for learning outcome 5 if local aquatic shops or marine conservation groups have open/fun days these could be useful for students to get involved with to help them to practically apply the theory and diversity behind educating customers/visitors. This learning outcome requires the use of The Education Aims in Zoos Expert Committee Handbook, Nov 2012 p. 42 (3.1) to structure discussions on how technology, interactive exhibits and guided tours can be used to meet these aims with groups of formal (School/college/special needs groups) and non-formal (visitors) participants.

Learners should be encouraged to use the theory they gain in class in their work placements and part time jobs. These experiences should then be shared with the class as they feel comfortable to encourage peer teaching and ensuring current industry practices are being discussed.

Employer engagement

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

Industry links can enable the teacher to access up to equipment for demonstration purposes that they may otherwise not have available to them.

Talks from online live food companies may help the students to envisage a business they could set up on a small scale and motivate them.

Large public aquaria will have education staff so these would be ideal people to link with for learning outcome 5 either just the teacher to access resources or with the students for a talk looking at educational strategy.

Suggested learning resources **Books**

Plankton Culture Manual Hoff, Frank H; Snell, T W
Published by: Florida aqua farms, Inc (2007) ISBN:
978-0-9662960-4-4

Advanced Marine Aquarium Techniques (2006) Hemdal, J F
Published by: t.f.h
ISBN: 0-7938-0565-1

The 101 Best Marine Invertebrates (2008) Michael, S W
Published by: t.f.h (Microcosm)
ISBN: 987-1-890087-23-4

Marine Fishes: 500+ Essential-to-know Aquarium Species (Pocket Expert Guide) (2001) Micheal, S W
Published by: t.f.h
ISBN: 9781890087388

Teaching Today a Practical Guide (2014) Petty, G
Published by: Nelson Thornes Ltd
ISBN: 9781408523148

The Reef Aquarium, Volume Three: Science, Art, and Technology (2005) Delbeek, C J; Sprung, J Published by: Ricordea
ISBN: 1883693144

Aquarium Corals: Selection, Husbandry and Natural History (2001) Borneman, E
Published by: t.f.h
ISBN: 1890087475

Aquarium Sharks and Rays (2001) Micheal, S W
Published by: t.f.h (Microcosm)
ISBN: 1-890087-57-2

The Biology of Fishes (2007) Bone, Q; Moore, R
Published by Taylor & Francis ISBN:
978-0415375627

Journals and magazines

Practical fishkeeping Coral

Journal of Fish Biology

Websites

Reefquest Biology of sharks and rays	www.elasmo-research.org/
London Zoo Education Programme	www.zsl.org/zsl-london-zoo/schools/education-sessions
Advanced Aquarist Fishkeeping Magazine	www.advancedaquarist.com/
University of Florida Tropical Aquaculture Laboratory	http://tal.ifas.ufl.edu/publications.htm
Reefkeeping online magazine	www.reefkeeping.com/joomla/index.php/reefkeeping-blog
Ornamental Trade Association (OATA)	www.ornamentalfish.org/
Zoo expert committee handbook (2012)	www.gov.uk/government/uploads/system/uploads/attachment_data / file/69611/pb13815-zoos-expert-committee -handbook1.pdf

Unit 362 Undertake Estate Skills

UAN:	K/507/4645
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is to introduce learners to common 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 developing 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

In this unit, learners will be able to

1. Construct, repair or maintain boundaries
2. Construct, repair or maintain structures
3. Construct, repair or maintain surfaces
4. Carry out practical habitat management work

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Construct, repair or maintain boundaries

Topics

1.1 Prepare for work on boundaries
1.2 Select equipment and materials
1.3 Construct, repair or maintain boundaries

In this outcome learners will develop the practical skills needed to construct, repair or maintain at least **two** different boundaries.

Boundaries, eg:

- Hedge, bank, ditch,
- Fence (post and rail, post and wire, electric, netting)
- Wall (stone, brick).

Topic 1.1

Learners will plan the task, clear debris and prepare the site, ensure livestock and public safety, consider factors associated with the location (eg power supply, waste disposal, equipment and materials storage).

Topic 1.2

Learners will select materials and equipment relevant to the task, taking into account health and safety, sustainable practice and cost implications.

Topic 1.3

Learners will undertake the task safely (eg implementation of risk assessment and appropriate Personal Protective Equipment (PPE)) and to the required standards.

Learning outcome:

2. Construct, repair or maintain structures

Topics

2.1 Prepare for work on structures
2.2 Select equipment and materials
2.3 Construct, repair or maintain structures

In this outcome, learners will construct, repair or maintain at least two different structures. These may typically be constructed from wood, metal, stone or brick. Learners are not expected to be able to fully construct substantial structures such as animal or machinery housing, however, it is anticipated that delivery could include repair and maintenance of such larger structures as would be found in an estate setting.

Structures eg:

- Gate
- Stile
- Horse jump
- Bird box
- Table
- Bench
- Door
- Raised bed
- Composting area or swim platform
- Large structures requiring repair or maintenance may include animal house or pen, machinery or feed store, garden furniture, shed and pergola.

Topic 2.1

Learners will plan the activity, clear debris and prepare the site, ensure livestock and public safety, consider location factors (power supply, waste disposal, equipment and materials storage).

Topic 2.2

Learners will select materials and equipment relevant to the task, taking into account health and safety, sustainable practice and cost implications.

Topic 2.3

Learners will undertake the task safely (eg implementation of risk assessment and appropriate Personal Protective Equipment (PPE)) and to the required standards.

Learning outcome:

3. Construct, repair or maintain surfaces

Topics

3.1 Prepare for work on surfaces
3.2 Select equipment and materials
3.3 Construct, repair or maintain surfaces

In this outcome learners are required to construct, repair or maintain one surface (eg path, road and hard standing) which could be either solid (eg decking, concrete and paving), or loose (eg gravel, wood chippings and sand). Where appropriate, learners should be aware of timeliness considerations, for example preparing concrete at the right time for construction.

Topic 3.1

Learners will plan the task, clear debris and prepare the site, ensure livestock and public safety, consider factors associated with the location (eg power supply, waste disposal, equipment and materials storage).

Topic 3.2

Learners will identify and select materials and equipment relevant to the task, taking into account health and safety, sustainable practice and cost implications.

Topic 3.3

Learners will undertake the task safely (eg implementation of risk assessment and appropriate Personal Protective Equipment (PPE)) and to the required standards.

Learning outcome:

4. Carry out practical habitat management work

Topics

4.1 Prepare for habitat management work

4.2 Select equipment and materials

4.3 Carry out practical habitat management work

In this outcome learners are required to undertake practical habitat management work (eg mowing, renovation, tree and shrub planting, clearing unwanted vegetation, coppicing, pruning, thinning, pond, stream and ditch clearance, and control of invasive species). Where appropriate, learners should be aware of time considerations, for example preparing concrete at the right time for construction.

Topic 4.1

Learners will plan the task, clear debris and prepare the site, ensure livestock and public safety, consider factors associated with the location (eg power supply, waste disposal, equipment and materials storage).

Topic 4.2

Learners will identify and select materials and equipment relevant to the task, taking into account health and safety, sustainable practice and cost implications.

Topic 4.3

Learners will undertake the task safely (eg implementation of risk assessment and appropriate Personal Protective Equipment (PPE)) and to the required standards.

Guidance for delivery

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.

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.

Suggested learning resources

Books

Dry Stone Walling: A Practical Handbook — Agate, E (Ed); Brooks, A & Adcock, S
Published by: The Conservation Volunteers, 1999
ISBN-10: 0946752192

Fencing: A Practical Handbook — Agate, E
Published by: The Conservation Volunteers, 2001

Footpaths: A Practical Handbook — Agate, E
Published by: The Conservation Volunteer, 2001

Hedging: A Practical Handbook — Agate, E & Brooks, A
Published by: The Conservation Volunteer, 1998
ISBN-10: 0946752176

Tree Planting and Aftercare: A Practical Handbook — Agate, E (Ed)
Published by: The Conservation Volunteer, 2001
ISBN-10: 0946752257

Tool Care: A Maintenance and Workshop Manual — Agate, E
Published by: The Conservation Volunteer, 2000

Waterways &Wetlands: A Practical Handbook — Agate, E
Published by: The Conservation Volunteer, 2001

Woodlands: A Practical Handbook — Agate, E (Ed)

Published by: The Conservation Volunteer, 2002
ISBN-10: 0946752338

Hedges and Hedgelaying – A Guide to Planting, Management and Conservation
Maclean, M
Published by: The Crowood Press, 2006 ISBN-
10: 1847976174

Poultry House Construction Roberts, M
Published by: Gold Cockerel Books, 1997
ISBN-10: 0947870210

The Smallholder's DIY Roberts, M
Published by: Gold Cockerel Books, 1999 ISBN-
10: 0947870172

Farm and Smallholder Fencing: A Practical Guide to Permanent and Electric Livestock Fencing on the Farm and Smallholding Roberts, M.
Published by: Gold Cockerel Books, 2005 ISBN-
10: 0947870423

Health and Safety Overview for Practical Conservation Project: A Guide to Good Practice for Conservation Groups and Land Managers Stokes, A
Published by: The Conservation Volunteer, 1999

Websites

The Conservation Volunteers	www.tcv.org.uk
Department for Environment, Food and Rural Affairs	www.defra.gov.uk
Health and Safety Executive	www.hsegov.uk
The Wildlife Trusts	www.wildlifetrusts.org
Forestry Commission	www.forestry.gov.uk

Unit 364 Business management in the Land-Based sector

UAN:	A/507/4648
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners look at the businesses within the land based sector, the role and responsibilities of those employed in land-based businesses and resource requirements.

This unit links closely to Unit 302: Undertake and review work related experience in the Land-based Industries.

Learning outcomes

In this unit, learners will be able to

1. Understand the breadth and importance of an industry in the 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

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand the breadth and importance of an industry in the land-based sector

Topics

1.1 Importance to the economy

1.2 Associated businesses

In this outcome, learners 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. 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.

Topic 1.1

Learners will understand the importance of businesses within the industry to the economy:

- Using measures available to the industry, including:
  - 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 (eg representative, regulatory, not-for- profit)
  - Regional variations
  - Changes and developments in the last 50 years.

Topic 1.2

Learners will understand the range of associated businesses allied to the industry, to include:

- Relevant industries in primary, secondary and tertiary industrial sectors (eg suppliers of raw materials, processors, distributors, retailers, service providers)
- Associated organisations:
  - Specific interrelationships between one business and other associated organisations eg:
    - Suppliers of goods and services
    - Representative organisations and professional bodies
    - Regulatory bodies
    - Competitors
    - Customers
    - Aims and roles of important organisations in the sector.

Learning outcome:

2. Understand business resources and structures

Topics

2.1 Legal structure and organisation
2.2 Physical resource requirements
2.3 Job roles and responsibilities

This outcome focuses on the legal and resource implications of constituting a business. Learners 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.

Topic 2.1

Learners will understand the legal structure and organisation for the following business types:

- Sole trader
- Partnership
- Limited company
- Not-for-profit organization
- Charity
- Public sector organisations
- Organisation staffing structure.

Topic 2.2

Learners will understand the physical resource requirements of a selected land-based business, to include:

- Property ie forms of tenure, appraisal of business potential
- Vehicles and machinery
- Tools and equipment
- Materials ie stocks control procedures
- Insurance of physical resources.

Topic 2.3

Learners will understand different job roles and responsibilities in a selected land-based business.

- Job roles relevant to the sector, including:
  - Director
  - Manager
  - Supervisor
  - Team worker
  - Trainee
  - Administrator
  - Volunteer
  - Sub contractor
- For each of the above job roles, learners will explore:
  - Job description (eg 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 (eg pay, working hours, holidays, equal opportunities, health and safety, employment protection).

Learners will know relevant employment legislation, including:

- Employment Act 2002
- National minimum wage Act 1998
- Working times regulation Act 1998
- Equality Act 2010.

Learning outcome:

3. Understand the business marketplace

Topics

3.1 Marketplace, customers and competitors
3.2 Supply chain
3.3 Quality management

In this outcome, 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.

Topic 3.1

Learners will understand the marketplace, customers and competitors for a land-based business by investigating the following:

- Size of market ie value of sales, number of customers
- External influences on the market ie political, economic, socio-cultural, technological
- Customer base ie number, type, characteristics, market segments
- Competitor analysis ie direct and indirect competitors.

Topic 3.2

Learners will understand the importance of efficiency and interdependency in a supply chain in a land-based context, considering the following:

- Suppliers
- Distributors
- Customers
- Supply chain assurance
- Ethics.

Topic 3.3

Learners will understand quality management systems and practices within a land-based business:

- Important aspects of quality in the sector
- Formal quality standards or approval eg BALI approved, Plant Passports, British Standards
- Informal systems and practices to achieve quality
- Problems arising if quality is not achieved.

Learning outcome:

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

Topics

4.1 Financial records

4.2 Physical records

4.3 Monitor business performance and progress

This outcome 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 complete a range of financial records. 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. 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.

Topic 4.1

Learners will understand the importance of keeping accurate financial records for a selected land- based business in relation to legal requirements and management efficiency. Learners will understand the following financial records:

- Purchasing and ordering procedures
- Order forms and orders
- Deliveries and receipts
- Invoices and sales records
- Credit control
- Payment methods
- Bookkeeping ie cash analysis, petty cash, cash flow, budgets, computer accounts programmes
- Basic accounts ie trading account, balance sheet, depreciation
- Taxation ie vat, income tax paye, national insurance contributions, corporation tax
- Wage calculation.

Topic 4.2

Learners will understand the importance of recoding physical records for a selected land-based business, to include:

- Production
- Inputs
- Staffing

- Customers
- Resource use
- Data protection
- Legal requirements to keep records eg pesticide use, veterinary medicines, transport, animal movement, passports.

Topic 4.3

Learners will understand how financial and physical records are used in monitoring business performance and progress, to include:

- Production levels
- Costs of production
- Financial efficiency
- Monitoring against targets
- Budgets
- Previous periods
- Relevant review periods ie weekly, monthly, annually
- Appropriate remedial actions
- Staff roles in recording and analysing information.

Guidance for delivery

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.

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.

Unit 365 Customer care and retail merchandising

UAN:	D/507/4710
Level:	3
GLH:	60

What is this unit about?

This unit aims to provide learners with an understanding of the importance of customer care and the principles of retail merchandising in the land-based sector. 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

In this unit, learners will be able to:

1. 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

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Deliver effective customer service

Topics

1.1 Review the needs of different customer groups
1.2 Demonstrate effective customer service skills
1.3 Evaluate customer service in a given land-based outlet

In this outcome, 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.

Topic 1.1

Learners will be able to recognise different customer groups and review their needs, to include: individuals, businesses. They will also be able to recognise customer classification eg age, sex, socio- economic group.

Topic 1.2

Learners will be expected to demonstrate effective customer service skills when dealing with customers, to include:

- Effective communication (eg addressing customers face to face, appropriate telephone manner, effective written communication, use of social media)
- Courtesy and helpfulness
- Appropriate dress and body language
- Product knowledge.

Topic 1.3

Learners will be able to evaluate customer service in a given land-based outlet taking the following into consideration: customer expectations, service standards, approach to customers, policies (eg refunds, complaints), after sales service, advice and assistance, compliance with Data Protection Act 1998.

Learning outcome:

2. Understand how to display items for sale

Topics

2.1 Customer flow and space layout of a given land-based outlet
2.2 Product display systems
2.3 Influence of legislation on goods displayed

In this outcome, 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.

Topic 2.1

Learners will be able to analyse customer flow of a given land-based outlet in relation to the direction of customer movements, and clarity of store layout aiding customer flow, eg:

- Store design and plan including position of entrance and exit
- Signage location and clarity
- Location of tills
- Aisle widths
- Access for customers including those with disabilities location of promotional offers.

Topic 2.2

Learners will evaluate product display systems of a given land-based outlet in relation to product groupings (eg by category of product, by species, according to perishability, seasonality, special promotions), types of display, location of displays.

Topic 2.3

Learners will understand how relevant legislation influences the display of goods in a land-based outlet. Relevant legislation would include: 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.

Learning outcome:

3. Understand methods of promotion and marketing

Topics

3.1 Methods of promotion

3.2 Marketing strategies for given land-based outlets

3.3 Recommend improvements to a given marketing strategy

This outcome 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.

Topic 3.1

Learners will compare different methods of promotion available to land-based businesses, to include: advertising in different media, (eg radio, newspaper, internet, television), public relations and sponsorship, special offers and discounts, direct mailing.

Topic 3.2

Learners will evaluate marketing strategies for given land-based outlets to include strategies relating to:

- Product (eg product design, product range, packaging)
- Price
- Promotion (eg advertising, public relations and sponsorship, special offers and discounts, direct mailing)
- Place (eg location, transportation, home delivery).

Topic 3.3

Learners will be able to give recommendations to support a given objective, eg increase market share, increase sales, increase customer base.

Learning outcome:

4. Understand the principles of ordering, pricing and controlling retail stock

Topics

4.1 Buying and ordering processes

4.2 Stock control and storage methods

4.3 Pricing methods

This outcome 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. This outcome also looks at buying, ordering and pricing methods and case study material would be useful to explore an appropriate range of methods.

Topic 4.1

Learners will be able to evaluate buying and ordering processes used in land-based outlets, to include:

- Methods of payment
- Credit arrangements
- Methods of ordering
- Documentation
- Locating suppliers
- Stock delivery.

Topic 4.2

Learners will evaluate different methods of controlling stock, to include: stock rotation, planning to meet demand, monitoring stock.

They will also understand the methods of storing products to include: perishable and non-perishable items, security, storage of plant health products, minimising wastage, compliance with relevant legislation and guidelines, eg DEFRA Code of Practice for Suitably Qualified Persons and Guidance for the Registration of Retail Premises 2008.

Topic 4.3

Learners will evaluate different pricing methods, to include:

- Cost based
- Competitor based
- Offers and discounts.

Guidance for delivery

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 farm retail shops, horticultural suppliers and garden centres.

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.

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.

Suggested learning resources

Books

Customer Service for Dummies Published by: Wiley Publishing, 2006 ISBN-10: 0471768693 ISBN-13: 978-0471768692	Leland, K & Bailey, A
S/NVQ 3 Customer Service Candidate Handbook Published by: Butterworth Heinemann, 2001 ISBN-10: 0435452274 ISBN-13: 978-0435452278	Bradley, S; Hebron, L & Woods, A
Marketing: Concepts and Strategies Published by: Houghton Mifflin, 5th edition, 2005 ISBN-10: 061853203X ISBN-13: 978-0618532032	Ferrel, O.C; Dibb, S; Simkin, L; Pride, W.M.
Business studies Published by: Causeway Press Ltd., 4th edition, 2008 ISBN-10: 1405892315 ISBN-13: 978-1405892315	Hall, D & al.
Business Studies - Second Edition Published by: Nelson Thornes, 1994 ISBN-10: 0748718761 ISBN-13: 978-0748718764	Needham, D & Dransfield, R

Websites

Business education website	www.bized.co.uk
Business Link website	www.businesslink.gov.uk
Marketing resources	www.marketingteacher.com
Case study materials and resources	www.thetimes100.co.uk

Unit 366 Exploring improvements, opportunities for diversification and new business initiatives within the Land Based sector

UAN:	K/507/6878
Level:	3
GLH:	60

What is this unit about?

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.

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

In this unit, learners will be able to:

1. Understand business improvement in land-based industries
2. Plan opportunities for practical business improvement
3. Produce business plans.

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand business improvement in land-based industries

Topics

1.1 Strategies a land-based business can adopt to improve performance

1.2 How land-based business can achieve competitive advantage

1.3 How a land-based business can improve its environmental impact

In this outcome, 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.

Topic 1.1

Learners will understand how the following strategies can improve business performance:

- Consolidation
- Expand market share
- Product development
- Market development
- Diversification
- SWOT analysis.

Learners will understand key indicators of improved business performance, to include:

- Improved effectiveness and efficiency in key business functional areas eg products, services, marketing, customer relations, staffing, staff management, working practices, production efficiency, financing, financial control
- Internal factors eg resources and management
- External factors eg political, economic, socio-cultural and technological.

Topic 1.2

Learners will understand how businesses can achieve a competitive advantage through:

- Cost of service
- Differentiation eg quality, location, customer service and perceived added value
- Use of marketing mix eg product, price, place, promotion.

Topic 1.3

Learners how businesses can improve its environmental impact taking the following into consideration:

- Resource use
- Waste

- Recycling
- Pollution ie chemical, biological, visual, audible, light
- Road traffic
- Carbon footprint
- Enhancement of the environment (eg preservation or creation of habitats, conservation of structures)
- Principles of sustainability
- Relevant environmental legislation:
  - 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.

Learning outcome:

2. Plan opportunities for practical business improvement

Topics

2.1 Potential improvements in a business within a land-based context
2.2 Plan for achieving business improvements or diversification within a land-based context

In this outcome, 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. Learners will need to prepare a detailed plan for implementation of proposed improvements.

Topic 2.1

Learners will explore a selected business and identify improvements, as specified in Topic 1.1.

Topic 2.2

Learners will plan for achieving business improvements or diversification, taking into account:

- Specific actions
- Rationale
- Timescales
- Resource implications
- Financial implications ie costs, likely returns
- Key factors for success and risks
- Forward, backward, horizontal diversification
- Opportunities in relation to resources, skills and finance needed.

Learning outcome:

3. Produce business plans

Topics

3.1 Research the market for a land-based business idea
3.2 Develop a land-based business idea
3.3 Produce business plans

In this outcome, learners will propose a land-based business plan. This could be based on business improvements or developments identified in outcome 2, a diversification proposal or for a new business start-up.

Topic 3.1

Learners will carry out market analysis using primary and secondary data, to include:

- Size
- Trends
- Competition
- Segmentation
- Target market.

Topic 3.2

Learners will propose a business development including:

- Establishment of a new business
- Diversification or development of new enterprise
- Recommendations for implementation of improvements to an existing business.

Topic 3.3

Learners will prepare a business plan for business idea developed. The completed business plan should be addressed to a specific audience and include:

- Business products or services
- Aims and objectives
- Market analysis ie size, trends, competition, segmentation, target market
- Physical resources ie property, machinery, vehicles, equipment and stock
- Human resources ie staffing structure, management and key personnel, job descriptions and person specifications
- Promotion ie media and cost
- Financial forecasts ie setting up costs, pricing, income, costs, profit and monthly cash flow forecast
- Finance needs
- Sources of finance ie equity, borrowing and grants
- Legal issues ie business type, trading terms and conditions, trading standards, licences, relevant current legislation, planning permission, health and safety, fire regulations, regulatory bodies, sources of advice.

Guidance for delivery

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. This maybe not-for-profit organisation and not restricted to commercial private sector businesses.

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.

Unit 367 Undertake a Specialist Project in the Land-Based sector

UAN:	D/507/4643
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is for learners to gain an understanding of the principles of undertaking a specialist 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.

Learners will develop project knowledge and skills by studying a chosen topic area through a project. They will explore topic areas that interest them and select one topic for their project. They will plan and carry out their specialist project working to meet deadlines and monitoring performance. Learners 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

In this unit, learners will be able to

1. Develop proposals for specialist projects
2. Plan for specialist projects
3. Carry out specialist projects
4. Evaluate specialist projects

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Develop proposals for specialist projects

Topics

1.1 Research topics for specialist projects using information sources
1.2 Project proposal

In this outcome, 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.

Topic 1.1

Learners will use a range of information sources to research topics for specialist project, including:

- Textbooks
- Journals
- Magazines
- Internet
- Trade literature
- Television and radio
- Subject experts.

Learners will comment on the validity and reliability of each type of information source.

Learners will carry out research using methods appropriate to the topic, for example:

- Literature review
- Trials, experiments
- Practical activities
- Questionnaires
- Interviews
- Surveys.

Topic 1.2

Learners will produce proposals for specialist projects, to include:

- Title
- Aims/objectives
- Methodology
- Information sources
- Resources required for completion of the project ie advice and support, computers, materials
- Justification of proposed project.

Learning outcome:

2. Plan for specialist projects

Topics

2.1 Planning operations and resources
2.2 Selection of resources

In this outcome, learners will complete a detailed action plan for completion of the specialist project within the set timescale. This should include, as a minimum:

- A detailed breakdown of key milestones 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.

Learners should also consider possible setbacks to their planned schedule and contingency plans to ensure timely completion of the project.

Topic 2.1

Learners will plan operations required to carry out a selected specialist project, to include:

- Project planning techniques
  - 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 eg illness, it problems, resource problems, cost
  - Contingencies
  - Remedial actions.

Topic 2.2

Learners will justify reasons for resources selected based on suitability, availability and cost, to include:

- People
- Time
- Buildings
- Equipment
- Animals
- Materials
- Literature and media eg internet, trade magazine
- It applications and budget.

Learning outcome:

3. Carry out specialist projects

Topics

3.1 Monitor progress
3.2 Health and safety implications

In this outcome, learners will conduct and complete their specialist project, collecting supporting evidence as appropriate, for example literature review, artefacts, witness statements, photographs or videos. 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, and identify any relevant legislation or codes of practice. Risk assessments may contribute to evidence of this.

Topic 3.1
When carrying out their project, learners will monitor progress against deadlines using a diary or action log.

Learners will monitor performance against :

- Schedule plan ie daily, weekly, monthly progress
- Budget
- Other appropriate measures for each tasks.

Learners will capture reasons and remedial actions if falling behind schedule using a diary or action log.

Deadlines can be defined as interim, key milestones or final, and should be reviewed at regular intervals by tutor/supervisor.

Topic 3.2
Learners will discuss the health and safety implications, where applicable, of the specialist project, taking into consideration:

- Health and safety
- Risk assessment
- Personal Protective Equipment (PPE)
- Relevant regulations and legislation
- Codes of practice.

Learning outcome:

4. Evaluate specialist projects

Topics

4.1 Report on project
4.2 Evaluating achievements and areas for improvement

In this outcome, 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.

Topic 4.1
Learners will report on the project either in a written report format, or verbally through a presentation.

Topic 4.2
Learners will evaluate achievements and areas for improvement for their specialist projects, including:

- 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.

Guidance for delivery

This unit is designed to encourage and develop learners' independent thinking and research skills. 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. Suitable project topics could include:

- trial or experiment
- investigation of an issue important to the sector
- production of a structure or artefact
- training programme
- improving a process
- investigation of a new product or service.

All referencing should comply with academic conventions.

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

Appendix 1 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**.

City & Guilds Centre Manual

This document provides guidance for organisations wishing to become City & Guilds approved centres, as well as information for approved centres delivering City & Guilds qualifications. It covers the centre and qualification approval process as well as providing guidance on delivery, assessment and quality assurance for approved centres.

It also details the City & Guilds requirements for ongoing centre and qualification approval, and provides examples of best practice for centres. Specifically, the document includes sections on:

- the centre and qualification approval process
- assessment, internal quality assurance and examination roles at the centre
- registration and certification of candidates
- non-compliance and malpractice
- complaints and appeals
- equal opportunities
- data protection
- management systems
- maintaining records
- internal quality assurance
- external quality assurance.

Our Quality Assurance Requirements

This document explains the requirements for the delivery, assessment and awarding of our qualifications. All centres working with City & Guilds must adopt and implement these requirements across all of their qualification provision. Specifically, this document:

- specifies the quality assurance and control requirements that apply to all centres
- sets out the basis for securing high standards, for all our qualifications and/or assessments
- details the impact on centres of non-compliance

The **centre homepage** section of the City & Guilds website also contains useful information on
Walled Garden: how to register and certificate candidates on line
Events: dates and information on the latest Centre events **Online assessment**: how to register for e-assessments.

Useful contacts

UK learners General qualification information	**E: learnersupport@cityandguilds.com**
International learners General qualification information	**E: intcg@cityandguilds.com**
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	**E: centresupport@cityandguilds.com**
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	**E: singlesubjects@cityandguilds.com**
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	**E: intops@cityandguilds.com**
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	**E: walledgarden@cityandguilds.com**
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	**E: business@cityandguilds.com**

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: **feedbackandcomplaints@cityandguilds.com**

About City & Guilds

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. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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