Department for Education

T Level Foundation Year Supporting progression to T Level

National technical outcomes Agriculture, environmental and animal care route

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Contents

Introduction

This document sets out national technical outcomes (NTOs) for the T Level Foundation Year (formerly the T Level Transition Programme), relevant to a particular T Level route. Delivery of the NTOs is expected as part of the programme, as set out in the Framework for Delivery and the NTOs will provide the basis for the content of T Level Foundation Qualifications that will be available from 2026. The T Level Foundation Year is a level 2 study programme to prepare young people for progression onto a T Level in a particular T Level route. There are NTOs for each T Level route.

Updating the national technical outcomes

We will review whether the NTOs need updating if and when there are any changes to T Levels or their content. As the NTOs are high level and relevant across a T Level route, we expect that they may need updating only where there are significant changes to T Level content. Should the NTOs need revising, we would expect AOs to review their qualification specification.

Who is this publication for?

This document is for anybody with an interest in the T Level Foundation Year national technical outcomes. This includes:

- Schools, colleges, training providers and their representative bodies
- Awarding organisations and their representative bodies
- Third sector and representative organisations
- Students, parents/guardians/carers
- Employers

Contact

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National technical outcomes explained

The NTOs provide students with an introductory foundation for any T Level in their chosen T Level route. They consist of a minimum of three outcomes that students are expected to be able to demonstrate by the end of the programme, and the knowledge and skills they will need to develop and apply to demonstrate the outcomes. The outcome-based structure of the NTOs is important to prepare students for the nature of T Levels.

The knowledge and skills within each outcome consist of topic areas and the underpinning content to be covered (the bullet points). They relate to the content of the T Levels in the route and are appropriate for level 2 study. Behaviours integral to achieving the outcome, and which can be explicitly assessed, are embedded into the skills. It is intended that students will typically acquire the knowledge and skills through realistic employment-related contexts and situations, and the outcomes are worded in a way that allows them to be applied in different contexts. Two routes – Agriculture, environmental and animal care and Health and science – include an outcome based on applying knowledge only.

Supplementary information is included for education providers to use, at their discretion, to support teaching and learning. For each outcome there is:

- an explanation for the combination of outcomes selected for the route
- the rationale for each outcome
- how the outcomes could be delivered in combination
- how to set the level of demand to meet students' development needs
- illustrative examples of how breadth and depth could be introduced into teaching and learning
- opportunities to support the contextualised development and application of English, maths and digital skills, and
- examples of behaviours that are integral to the outcome but not expected to be assessed explicitly.

The NTOs are intended to provide a minimum foundation for the T Level route, not competence in any occupation. They are designed to be taught within approximately 120-150 guided learning hours (GLH), with each outcome designed for approximately 30-50 GLH, based on the minimum level of knowledge and skills essential for demonstrating the outcomes. This allows education providers to add more breadth or depth, according to students' development needs, whilst ensuring there is sufficient time for the other components of the T Level Foundation Year.

A glossary of terms is provided in the Annex.

Information for awarding organisations

- Each T Level Foundation Qualification must be based on the NTOs for a single T Level route.
- Awarding organisations will be expected to adhere to the principles for developing the NTOs into qualification content.
- Awarding organisations may also refer to the supplementary information should they wish to do so, but this is not required.
- T Level Foundation Qualifications must focus on students' demonstration of the outcomes in the NTOs, through the application of relevant knowledge and skills. The outcomes are designed to be demonstrated independently or in combination.
- The outcomes are broad and applicable to different contexts but assessments could be set in a single context.
- In determining their assessment design, awarding organisations will need to refer to Ofqual's conditions, requirements and guidance for these qualifications.

Principles for developing the national technical outcomes into qualification content

Principle 1: Qualification content must include all the outcomes for the route and the specified knowledge and skills

This will ensure an overall level of consistency across different qualifications in the same route. Assessment must focus on the demonstration of these outcomes. The knowledge and skills topic area headings and the underpinning bullets reflect the minimum needed to demonstrate the outcomes, so this is expected to be included in the qualification content. All the optional content will need to be developed, where optionality between or within an outcome is specified in the NTOs for the route, and this optionality must be available to students taking the qualification.

Principle 2: Elaboration of the detailed qualification content must fit within the guideline size of 120 to 150 GLH for these qualifications, be relevant to demonstrating the outcomes and must not constrain skills development

The guideline size reflects that the NTOs were designed so that the minimum knowledge and skills required to demonstrate the outcomes can be taught within this range, excluding assessment time. The knowledge and skills within the NTOs are expressed in high-level terms so they will need to be elaborated on to develop the detailed content to be taught. Detailed content should not be included where it is not relevant to demonstrating the outcome. Skills development takes time and is an important part of the NTOs as preparation for T Levels, so this should be allowed for when determining the detailed qualification content.

Principle 3: Additional content may be proposed but we would expect this to be minimal; it must be relevant to demonstrating the outcome and fit within the size guideline

The rationale for proposing to include any additional content, above the minimum content set out in the NTOs, must be clear. Any extra content that is proposed should ensure the qualification size still fits within the size guideline for these qualifications and it does not change the nature of the outcome. Additional skills content, particularly transferable skills, should be prioritised over proposing extra knowledge content, as skills development is important preparation for T Levels. No additional outcomes may be introduced.

National technical outcomes: Agriculture, environmental and animal care route

All students are to develop the knowledge and skills to be able to demonstrate the following three outcomes, by the end of the programme:

Outcome 1 (O1). Apply knowledge and understanding of scientific concepts and principles to agriculture, environmental and animal care contexts
Outcome 2 (O2). Develop enterprising ideas for business development opportunities in agriculture, environmental and animal care businesses
Outcome 3A (O3A). Maintain the health and welfare of animals OR
Outcome 3B (O3B). Support the sustainable development of plants

Introductory rationale

Preparing for progression to T Levels in the Agriculture, environmental and animal care route

These national technical outcomes are designed to support progression to either the Agriculture, land management and production T Level (introduced from September 2023), or the Animal care and management T Level (introduced from September 2024).

The outcomes introduce theories, concepts and principles that are relevant to the core of both T Levels within the route. The scientific content has been selected as relevant to both animals and plants and to support a route-based approach to learning – one of the key principles of the T Level Foundation Year. The outcomes also allow for technical skills development with a choice of working with plants or animals. There are also opportunities to work with engineered tools and equipment.

The three outcomes will provide opportunities for students to learn about different occupations within the route. For example, when learning about business development opportunities, students can learn about equine yard management or farm management, leading to an opportunity to learn about associated occupations at local and national levels, their roles and responsibilities and entry and progression pathways to those occupations. This will support students to make informed choices about their next step and which T Level is most appropriate for their career aspirations.

Setting the level to meet individual student needs

For level 2, students will be expected to apply their learning in contexts that are relatively straightforward, routine and familiar. For example, when learning about business development opportunities, students should focus on small businesses with a one type of product or service.

When studying the practical outcomes (O3A and O3B), they should be working with animals and plants that they are familiar with such as those studied during outcome 1.

Providers may want to introduce stretch and challenge for students by introducing contexts that are more complex and unfamiliar. For example, such as businesses dealing with an international focus, animals and plants with specific care needs.

Holistic delivery of outcomes

These outcomes can be delivered independently of each other, with each focussed on different situations and contexts. This allows for students to explore different contexts and situations from across the route.

However, they can also be delivered together in combination through a route-based project. For example, having proposed a new development opportunity for a business (O2), drawing on scientific knowledge (O1), students then apply skills to support animals or plants within the new business context (O3A and O3B).

Outcome 1: Apply knowledge and understanding of scientific concepts and principles to agriculture, environmental and animal care contexts

Rationale

This outcome focuses on underpinning scientific knowledge which is fundamental to a range of agriculture, environmental and animal care contexts.

The outcome is structured into topic areas and each topic area relates to a scientific concept. It is important that students are not only supported to develop knowledge and understanding of the concepts, but also to apply them within the agriculture, environmental and animal care sectors, to reflect the requirement to apply knowledge and understanding in T Levels.

The outcome focusses on knowledge only to ensure students can grasp fundamental scientific concepts and their application across a range of different contexts, particularly those in outcomes O3A and O3B. For example, students could learn how the scientific concepts are applied to precision farming or to developing horses for competition for outcome 2. Applying understanding to different contexts can potentially also provide opportunities to stretch learning to more route-based content, such as engineering.

Although some of this knowledge is covered at Key Stages 3 and 4, students may have misconceptions and gaps in their knowledge related to these topics, which may hinder them when they progress to T Levels. In addition, students may not have applied that knowledge to agriculture, environmental and animal care contexts and so this outcome would show the relevance of that prior learning to the chosen progression route.

The focus on knowledge and understanding enables providers to prepare students for T Level style exam assessments. It would support the development of core knowledge, skills and behaviours from the Framework for Delivery, particularly skills for successful study, supporting progression to level 3 study.

The outcome provides opportunities for students to develop and apply maths techniques, particularly related to statistics where scientific evidence can be analysed and interpreted.

The study of animal science should relate to mammals. The study of plant science should relate to flowering and non-flowering plants, including trees.

Knowledge

Classification and adaptations

- Classification: classification systems (including how organisms can be classified into groups by the features they share), the binominal systems of naming genus and species, main features used to place organisms into animal and plant kingdoms, applications of classification systems in agriculture, and environmental and animal care contexts
- Adaptation: how organisms are adapted to live in their natural environment and features that enable organisms to survive in those environments

Animal and plant anatomy and physiology

- Organ systems: reproductive system in animals and plants, respiratory system in plants and animals, and physical structures and functions
- Disorders: in reproductive and respiratory systems, causes, symptoms and effects on health and welfare

Animal and plant health

- Pathogens: routes of transmission, physical defences and chemical defences
- Parasites and pests: routes of transmission, control, prevention and impact on health

Animal and plant nutrition

- Nutrients: types and sources
- Nutrition: factors impacting on the quality of nutrition including situation, purpose, soil type (for plants) and animal environment (for animals)
- Metabolism: process and nutritional impact

Biosecurity

- Biosecurity: risk factors in different types of plant and animal environments, measures to prevent and control biosecurity risks

Materials

- Materials: types of materials, properties, applications in different agriculture, environmental and animal care contexts

Numeracy

- Visual representation of data: techniques and formats
- Data analysis: techniques used to identify patterns and variances, trends, correlation and extrapolation
- Standard units of measurement: quantities, weights, lengths, volumes and conversion between units

- Number and the number system: techniques for the application of the four operations (addition, multiplication, subtraction, division), working with whole numbers, percentages, fractions and decimals

Supplementary information to support teaching and learning

Illustrative examples: Develop breadth through:

Contexts

- Types of animals: birds, aquatics, invertebrates and herptiles
- Types of plants and trees

Animal and plant anatomy and physiology

- Range of organ systems

Animal and plant health

- Range of pathogens, parasites and pests that affect animals and plants

Engineering

- Electrical principles, units of electrical measurement and typical electrical calculations (for example, Ohm's law)
- Physics of engineering systems

Illustrative examples: Develop depth for stretch and challenge through:

- How classification systems reflect evolutionary relationships
- Similarities and differences between anatomy and physiology of different animal species
- Similarities and differences between anatomy and physiology of different plant species
- Impact of evolution and adaptation on anatomy and physiology
- Pathological implications of diseases to plants and animals
- Treatments for diseases and disorders in plants and animals
- The relationship between plant hormones and plant growth and development
- How soil characteristics affect suitability for different types of plants in different types of environments for different purposes
- Selective breeding and gene technology
- How properties of materials affect their suitability and use
- Use a scatter diagram to recognise a correlation between two variables
- Construct and interpret histograms

Mapping of opportunities to support students' development of English, maths and digital skills:

Maths

- GCSE: Number
    - Number and the number system: techniques for the application of the four operations (addition, multiplication, subtraction, division), working with whole numbers, percentages, fractions and decimals
    - Standard units of measurement
- GCSE: Algebra
    - Visual representation of data
    - Data analysis
- GCSE: Statistics
    - Visual representation of data
    - Data analysis
- Functional skills: Using numbers and the number systems
    - Techniques for the application of the four operations (addition, multiplication, subtraction, division)
    - Working with whole numbers, percentages, fractions and decimals
- Functional skills: Measures, shape and space
    - Standard units of measurement
- Functional skills: Handling information and data
    - Visual representation of data
    - Data analysis

Outcome 2: Develop enterprising ideas for business development opportunities in agriculture, environmental and animal care businesses

Rationale

This outcome focuses on business development. It provides a purposeful context for the introduction of fundamental knowledge relating to sustainability, ethics, supply chain and finance – core elements of both T Levels in the Agriculture, environmental and animal care route that have been identified by providers as potentially challenging for students to grasp. An understanding of business concepts is relevant to any occupation and so its importance goes beyond simply preparation for the T Level. It contributes to understanding the priorities and activities of future employers. The outcome enables students to look ahead to the development of business and occupations within the route with a focus on the use of technologies such as for precision farming or Radio-Frequency Identification (RFID) tags for animals.

This content has been brought together in this outcome to indicate to students the inter-relationship of concepts and their contribution to business success.

Through this outcome, students will develop transferable skills related to investigation and planning. There are also opportunities to develop creativity in their thinking as they consider different options for different businesses.

The outcome provides opportunities to develop written and oral communication skills when presenting their enterprising proposals. Through their investigations, students will read written information presented in different formats to develop their overall literacy skills and ability to analyse information and data.

Digital skills will be developed through this outcome when students carry out online research and when producing written proposals and materials to support an oral presentation.

It is envisaged that students will be presented with business related information that they use to identify enterprising opportunities for business development. Students will develop their ideas and present to others orally and in writing. This could be to their peers, T Level students and/or employers. There are opportunities for students to work in groups, but this is not a requirement.

Knowledge

Business

- Business organisations: types of ownership, common structures, aims and values, products and services provided, and interrelationships and contribution to business success

- Enterprise: key principles, concept of risk and reward, types of risks and rewards and how enterprise is used to develop business growth and change
- Business competitiveness: strategies and techniques used by businesses to improve competitiveness
- Finance: key financial terms, concepts of revenue, expenditure, profit and budgeting, sources and how they contribute to business success

Sustainability

- Sustainable development: national and international development goals, purpose of targets, associated actions, benefits of sustainability actions to organisations, societies and environments
- The concept of climate change and scientific views on causes and impacts
- Technological developments applied in agriculture, environmental and animal care contexts and their contribution to sustainability and business success
- Waste management: principles, techniques (refuse, reduce, reuse, repurpose, recycle), procedures and impact on environment
- Supply chain management: key principles, concept of sustainable procurement, benefits and limitations

People

- Ethics: characteristics of ethical behaviour

Project management

- Project management lifecycle: terminology, key stages and requirements at each stage
- Project planning: project scope, client expectations, resources availability and timeframe
- Project planning and monitoring: tools and techniques

Information and data

- Sources of financial and non-financial data and information used to measure business success: purpose, typical content, typical format and terminology

Investigation

- Validity of information and data: accuracy, reliability, currency and bias
- Referencing of sources: techniques used to reference sources directly, paraphrasing and different types of sources

Communication

- Principles of effective communication: two-way process, methods, styles, conventions of different types of written communication and suitability for different purposes and audiences
- Reading: principles, reading for comprehension, identifying salient points and synthesising information from different sources
- Spelling, punctuation and grammar (SPAG): punctuation markers, grammatical conventions and spelling of key technical and non-technical terminology
- Vocabulary: technical and non-technical and used to achieve particular effects and for different purposes
- Listening techniques: active and deep
- Non-verbal communication: meaning of different types of body language, types and value of images and support materials as visual aids and impact of non-verbal communication to support comprehension of key messages
- Oral communication: pitch, tone and intonation and their impact on how a message is received
- Engaging with an audience: techniques for establishing rapport, in conversation, in discussion, obtaining and clarifying information and presenting proposals

Digital

- Software: features, functions, applications for creating written documents, project management and presenting information
- Management of digital information and data: classification and organisation, naming conventions, storage systems, protection methods and accessibility
- Online/internet searches: techniques used to carry out and refine searches, and Search Engine Optimisation (SEO) and its implication for search results

Skills

Planning

- Identify discrete steps required to achieve an outcome
- Estimate time and resources needed to achieve an outcome
- Prioritise activities required to achieve an outcome
- Sequence activities required to achieve an outcome

Analysing

- Identify common features in information
- Organise common features into types

- Discern patterns in information
- Deconstruct information

Investigating

- Develop search criteria to support an investigation
- Identify sources of information to support an investigation
- Reference source of information
- Interrogate information for validity

Decision-making

- Identify likely impact of decisions
- Assess evidence and advice to support decision-making
- Justify how a decision would lead to achieving an outcome
- Substantiate proposals with evidence

Creativity skills

- Lateral thinking to consider opportunities from different perspectives
- Make novel connections between ideas
- Recognise ideas, possibilities and/or alternatives
- Form ideas iteratively

Communicating

- Synthesise information from different sources
- Engage an audience
- Summarise information
- Apply technical language in relevant contexts
- Apply active listening techniques to audience interaction
- Apply oral communication techniques to clearly articulate a message
- Create documents appropriate to audience and purpose
- Engage in discussion listening to and responding to questions and feedback
- Apply inclusive approach to engaging with others
- Apply communication techniques to secure audience understanding

Digital skills

- Organise digital information

- Store digital information securely
- Apply software functions to present information and images
- Apply software functions to produce written texts
- Apply software functions for project management

Supplementary information to support teaching and learning

Illustrative examples: Develop breadth through:

Business

- Types of business organisations: types of business objectives and values associated with different types of business; different agriculture, environmental and animal care businesses; different business sizes and techniques used to measure success
- Enterprise principles: risk taking, innovation and resilience
- Types of risk: financial and reputational
- Types of costs incurred by businesses and measures used to reduce costs and implications of their use to profitability, reputation and quality
- Range of opportunities available to support business development across the agriculture, environmental and animal care route

Sustainability

- Sustainable development goals for businesses and the types of sustainable development used to meet development goals
- The impact of climate change on habitats, flora, fauna and water levels

Illustrative examples: Develop depth for stretch and challenge through:

- Policies and practices used to manage the impact of climate change on environments at a national and international level
- The relationship between carbon, water and biodiversity and their impact on climate change and how agriculture, environmental and animal care organisations contribute to positive impacts
- Supply chain: types of procurement and their suitability for different situations
- Finance: implications of cost cutting to employees and the supply chain; cash flow forecasts and how they are calculated and presented
- The relationship between ethics, business objectives and values and stakeholder relationships
- Information and data: range of functions and features of different types of software, use of advanced software features to present information and data
- Knowledge of team working principles and associated skills
- Construct and interpret histograms

Behaviours:

- Enterprising
- Responsive
- Self-aware
- Self-confidence

Mapping of opportunities to support students' development of English, maths and digital skills:

English

- GCSE: Critical reading and comprehension
    - Synthesise information from different sources
    - Summarise information
- GCSE: Writing
    - Apply technical language in relevant contexts
    - Apply written communication techniques to produce formal reports following standard conventions
- GCSE: Spoken language
    - Engage an audience
    - Apply technical language in relevant contexts
    - Apply active listening techniques to audience interaction
    - Apply oral communication techniques to clearly articulate a message
    - Engage in discussion listening to and responding to questions and feedback
- Functional skills: Reading
    - Synthesise information from different sources
    - Summarise information
- Functional skills: Writing
    - Apply technical language in relevant contexts
    - Apply written communication techniques to produce formal reports following standard conventions

- Functional skills: Speaking, listening and communicating
    - Engage an audience
    - Apply technical language in relevant contexts
    - Apply active listening techniques to audience interaction
    - Apply oral communication techniques to clearly articulate a message
    - Engage in discussion listening to and responding to questions and feedback

Digital

- Functional skills: Using devices and handling information
    - Organise digital information
    - Store digital information securely
- Functional skills: Creating and editing
    - Apply software functions to present information and images
    - Apply software functions to produce written texts
    - Apply software functions for project management
- GDC: Using digital technology effectively
    - Organise digital information
    - Store digital information securely
    - Apply software functions to present information and images
    - Apply software functions to produce written texts
    - Apply software functions for project management

Outcomes 3A or 3B

Students are expected to complete either outcome 3A or outcome 3B, dependent on the T Level they are most likely to progress to.

Outcome 3A: Maintain the health and welfare of animals*

* animals refers to mammals, including farm animals, horses and small domestic animals.

Rationale

This outcome focuses on the technical skills that can be applied when working within the animal care sector. The technical skills are those that are relevant to many occupations in the sector, such as working in zoos, equine yards and veterinary surgeons' practices. The skills are also relevant to the two occupational specialisms in the T Level in Animal care and management.

Skills related to maintaining the health and welfare of animals are fundamental – the ability to work closely with the animal without harm to the individual or the animal is critical. It is therefore important to include such an outcome to support students to identify whether they have the appropriate attributes needed to work closely with animals.

The development of technical skills is underpinned with technical knowledge that supports the student to meet the outcome, making appropriate decisions regarding their choice of actions.

In addition to technical skills associated with handling animals, the outcome also develops transferable skills in self-management where students take responsibility for their own tasks.

It is envisaged that the students will communicate with others to determine animals' needs and provide information on animals' health and welfare; and they will develop oral communication skills for engaging in discussions and conversations.

In meeting animals' needs, students will naturally be required to determine resource needs such as nutritional and accommodation requirements, which will support the development of associated numeracy skills.

It is envisaged that students will develop their technical skills in supported environments, working with mammals and learning as much from the observation of others as their own practice. This acknowledges the need to minimise contact with animals which may cause harm.

Knowledge

Animal health and welfare

- Animal welfare frameworks: needs, domains and best practice in ensuring they are implemented
- Animal handling: techniques for safe and welfare-orientated animal handling capture and restraint
- Animal stress: techniques to protect an animal from stress, personal behaviour and how these are applied
- Physical and behavioural signs of good and poor animal health and welfare
- Techniques used for monitoring and maintaining the health and welfare of animals and how they are applied

Biosecurity

- Biosecurity: risk factors in different types of animal environments, measures to prevent and control biosecurity risks

Tools and equipment

- Tools: characteristics, purpose, safety, security, storage, maintenance, applications and operation of tools used to maintain the health and welfare of animals
- Equipment: characteristics, purpose, safety, security, storage, maintenance, applications and operation of equipment used to maintain the health and welfare of animals

Materials

- Factors affecting choice of materials: sustainability, cost, availability, durability, form and suitability for purpose

Information and data

- Types of data and information (including social media) created, retrieved and recorded when maintaining the health and welfare of animals
- Factors to consider when using information and data: confidentiality, privacy, intellectual property and security

Communication

- Listening techniques: active and deep
- Engaging with an audience: techniques for establishing rapport, in conversation and in obtaining and clarifying information
- Reading: principles, reading for comprehension, identifying salient points and summarising key points

Numeracy

- Standard units of measurement: length, area, volume, time, temperature, weight, capacity and conversion between units
- Numbers and the number system: techniques for application of the four operations (addition, multiplication, subtraction, division), working with whole numbers, decimals and percentages
- Algebra: standard mathematical formulae, techniques used to rearrange formulae to change the subject and algebraic notation
- Measurement: principles, standards, terminology, accuracy and errors
- Geometry: principles, properties of geometric points, lines and angles

Skills

Animal health and welfare technical skills

- Prepare environments where animal care activities are to take place
- Apply biosecurity measures when maintaining the health and welfare of animals, for example, ensuring cleanliness of self when moving from one location to another
- Move animals
- Monitor animals' health and wellbeing
- Assess animals' mobility
- Prepare animal accommodation for use
- Prepare animal feed
- Provide animal feed and water to animals
- Maintain tools, equipment and/or machinery

Health and safety skills

- Assess a situation for potential adverse effects
- Assess an area for potential health and safety risks
- Establish a safe working area
- Apply Personal Protective Equipment (PPE) appropriately following agreed procedures
- Apply manual handling techniques when lifting and moving live animals and heavy objects
- Apply cleaning techniques to an environment

Use of tools and equipment

- Inspect tools and equipment for potential defects and safety issues

- Prepare tools and equipment for effective use
- Apply techniques to effectively use tools to meet requirements of the task and situation
- Apply techniques to effectively use equipment to meet requirements of the task and situation

Physical dexterity skills

- Apply precise and controlled movements with appropriate application of force and fine motor skills

Self-managing

- Monitor own performance against objectives
- Reflect on feedback on own performance
- Manage own time in achieving objectives

Self-reflecting

- Identify success criteria
- Consider process and evidence
- Situational awareness
- Making judgements

Communicating

- Actively listen
- Use oral communication methods to obtain and clarify information and data on animals
- Compare information, ideas and opinions in different texts
- Summarise information and ideas

Recording

- Capture information and data
- Transcribe information from one source to another

Numeracy skills

- Estimate resources required to complete activities
- Apply the four operations to calculate the amounts and volumes of materials required

Measuring

- Measure lines and areas of environments and materials

Supplementary information to support teaching and learning

Illustrative examples: Develop breadth by through:

Contexts

- Types of animals: birds, aquatics, invertebrates and herptiles

Animal welfare

- Different types of animal environments
- Natural behaviour of animals: eating habits and social groupings
- How different types of foods are safely and hygienically stored and prepared for different environments
- Maintaining health and welfare of horses through riding
- Technologies used to monitor and maintain animal health and welfare
- Principles of customer service and their application in different animal care environments

Tools and equipment

- Different types of tools and equipment

Materials

- Different types of materials

People

- Roles and responsibilities of different occupations involved in maintaining health and welfare of animals in different types of environments

Illustrative examples: Develop depth for stretch and challenge through:

- How classification systems reflect evolutionary relationships
- Similarities and differences between anatomy and physiology of different animal species
- Similarities and differences between anatomy and physiology of different plant species
- Impact of evolution and adaptation on anatomy and physiology
- Pathological implications of diseases to plants and animals
- Treatments for diseases and disorders in plants and animals
- The relationship between plant hormones and plant growth and development
- How soil characteristics affect suitability for different types of plants in different types of environments for different purposes
- Selective breeding and gene technology
- How properties of materials affect their suitability and use
- Use a scatter diagram to recognise a correlation between two variables
- Construct and interpret histograms

Behaviours:

- Attention to detail
- Reliable
- Self-controlled

Mapping of opportunities to support students' development of English, maths

English

- GCSE: Critical reading and comprehension
    - Compare information, ideas and opinions in different texts
    - Summarise information and ideas
- GCSE: Writing
    - Capture information and data
    - Transcribe information from one source to another
- GCSE: Spoken language
    - Actively listen
    - Use oral communication methods to obtain and clarify information and data on animals
- Functional skills: Reading
    - Compare information, ideas and opinions in different texts
    - Summarise information and ideas
- Functional skills: Writing
    - Capture information and data
    - Transcribe information from one source to another
- Functional skills: Speaking, listening and communicating
    - Actively listen
    - Use oral communication methods to obtain and clarify information and data on animals

Maths

- GCSE: Number
    - Estimate resources required to complete activities
    - Calculate the amounts and volumes of materials required
- GCSE: Geometry and measures
    - Measure lines and areas of environments and materials
- Functional skills: Using numbers and the number system
    - Estimate resources required to complete activities
    - Calculate the amounts and volumes of materials required
- Functional skills: Measures, shape and space
    - Measure lines and areas of environments and materials

Outcome 3B: Support the sustainable development of plants

Rationale

This outcome focuses on the technical skills that can be applied when working within the agriculture, environment and land production sector. The technical skills are those that are relevant to many occupations in the sector, such as working in farms, plant nurseries, woodlands and florists. The skills are also relevant to many of the occupational specialisms in the T Level in Agriculture, environment and land production.

Skills related to supporting the development of plants are fundamental to any occupation that involves growing plants of any type in different types of locations. It is therefore important to include such an outcome to support students to identify whether they have the appropriate attributes needed to work closely with different types of plants, whether large trees or delicate flowering shrubs.

The development of technical skills is underpinned with technical knowledge that supports the student to meet the outcome, making appropriate decisions regarding their choice of actions.

In addition to technical skills associated with working with plants, the outcome also develops transferable skills in self-management where students take responsibility for their own tasks.

It is envisaged that the student will communicate with others to determine actions required to support plant development and provide information on their development and so will develop oral communication skills for engaging in discussions and conversations.

In supporting plant development, students will naturally be required to determine resource needs such as resource requirements, which will support the development of associated numeracy skills.

It is envisaged that students will develop their technical skills in supported environments to support health and safety.

For the content of this outcome, supporting plant development should be considered in the context of crop production, tree and woodland management and horticultural environments.

Knowledge

Plant establishment and maintenance

- Planting and sowing: pre-establishment and post-establishment processes, techniques for and considerations

- Soils and growing media: types, characteristics, properties and suitability for plant growth in different environments
- Cultivated areas: considerations for maintaining cultivated areas including plant health, unwanted vegetation, pests and environmental impacts
- Soil cultivation: including primary, secondary, reduced, characteristics and techniques
- Plant health: techniques for maintenance

Biosecurity

- Biosecurity: risk factors in different types of plant environments, measures to prevent and control biosecurity risks

Health and safety

- Typical health and safety hazards when applying technical skills to supporting the development of plants
- Likelihood and severity of health and safety risks associated with typical hazards
- Controls used to minimise health and safety risks
- Risk assessment: purpose, use and content
- Organisational health and safety policies and their role in meeting legal requirements
- Cleaning procedures used to maintain safe and hygienic environments: ‘clean as you go’, pre-cleaning, sanitising, disinfecting, rinsing, drying and handwashing
- Techniques used to support health and safe working practices, including manual handling

Tools and equipment

- Tools: characteristics, purpose, safety, security, storage, maintenance, applications, operation of tools used to support plant development in their environment
- Equipment: characteristics, purpose, safety, security, storage, maintenance, applications and operation of equipment used to support plant development in the environment

Materials

- Factors affecting choice of materials: sustainability, cost, availability, durability, form and suitability for purpose

Sustainability

- Waste management: principles, techniques (refuse, reduce, reuse, repurpose, recycle) and procedures
- Sustainable materials: characteristics, purpose, applications and impact on plant development

Information and data

- Sources of information required to undertake plant growth and development activities: purpose, typical content, typical format and terminology
- Types of recording documents: purpose, typical content and typical purpose
- Factors to consider when using information and data: confidentiality, privacy, intellectual property and security

Communication

- Listening techniques: active and deep
- Engaging with an audience: techniques for establishing rapport, in conversation and in obtaining and clarifying information
- Reading: principles, reading for comprehension, identifying salient points and summarising key points

Numeracy

- Standard units of measurement: length, area, volume, time, temperature, weight and capacity
- Numbers and the number system: techniques for application of the four operations (addition, multiplication, subtraction, division), working with whole numbers, decimals and percentages
- Algebra: standard mathematical formulae, techniques used to rearrange formulae to change the subject and algebraic notation
- Measurement: principles, standards, terminology, accuracy and errors
- Geometry: principles, properties of geometric points, lines and angles and Pythagoras' theorem

Skills

Plant development technical skills

- Prepare environments for activities, including protection for the environment
- Apply biosecurity measures when supporting plant development in their environments
- Cultivate soil
- Establish plants, for example, sow, drill and plant
- Apply plant protection
- Trim plants
- Cut back plants
- Prune plants

- Remove unwanted vegetation

Health and safety skills

- Assess a situation for potential adverse effects
- Assess an area for potential health and safety risks
- Establish a safe working area
- Apply Personal Protective Equipment (PPE) appropriately following agreed procedures
- Apply manual handling techniques when lifting and moving heavy objects
- Apply cleaning techniques to an environment

Use of tools and equipment

- Inspect tools and equipment for potential defects and safety issues
- Prepare tools and equipment for effective use
- Apply techniques to effectively use tools to meet requirements of the task and situation
- Apply techniques to effectively use equipment to meet requirements of the task and situation

Sustainability skills

- Dispose of waste sustainably
- Minimise waste

Self-managing

- Monitor own performance against objectives
- Reflect on feedback on own performance
- Manage own time in achieving objectives

Physical dexterity skills

- Apply precise and controlled movements with appropriate application of force and fine motor skills

Self-reflecting

- Identify success criteria
- Consider process and evidence
- Situational awareness
- Making judgements

Communicating

- Actively listen
- Use oral communication methods to obtain and clarify information and data on plants
- Record plant information and data
- Compare information, ideas and opinions in different texts
- Summarise information and ideas
- Interpret maps and garden design plans

Recording

- Capture information and data
- Transcribe information from one source to another

Numeracy skills

- Estimate resources required to complete activities
- Calculate the amounts and volumes of materials required
- Measure lines and areas of environments and materials

Supplementary information to support teaching and learning

Illustrative examples: Develop breadth through:

Contexts

- Different types of plants in different types of environments

Plant establishment and maintenance

- Uses and benefits of plants to the economy, society and the environment
- Calculations and measurements: for different materials and different environments
- Consideration of indoor (container based) systems as well as outdoor (field, open ground) systems for plant development

Tools and equipment

- Tools, equipment and materials: different types of tools, equipment and materials

Information and data

- Sources of information required to undertake plant growth and development activities: maps, site plans, schedules, product and equipment specifications and maintenance plans
- Types of recording documents: stock records and site plans

Floristry

- Characteristics of the elements and principles of design and their applications
- Assembly of floral materials to a design brief

Land-based engineering

- Operating principles of equipment and machinery used in agriculture, environmental and land production environments, mechanical and electronic principles

Illustrative examples: Develop depth for stretch and challenge through:

- Analysis of a range of factors that can impact on successful establishment and maintenance of different types of plant development environments
- Relationship between land use, change of land use, plant development and society
- The physical characteristics of indoor and outdoor environments (sites) where plants are grown implications of site characteristics and how they can be manipulated to support plant growth and development
- Propagation principles and techniques
- Introduction of advanced technical skills related to specific occupations
- Application of plant biology knowledge to decision making
- Hierarchy of risk controls
- Application of knowledge to business decision making
- Hierarchy of risk controls
- Application of knowledge to business decision making

Behaviours:

- Attention to detail
- Reliable
- Self-controlled

Mapping of opportunities to support students' development of English, maths

English

- GCSE: Critical reading and comprehension
    - Compare information, ideas and opinions in different texts
    - Summarise information and ideas
- GCSE: Writing
    - Capture information and data
    - Transcribe information from one source to another

- GCSE: Spoken language
    - Actively listen
    - Use oral communication methods to obtain and clarify information and data on animals
- Functional skills: Reading
    - Compare information, ideas and opinions in different texts
    - Summarise information and ideas
- Functional skills: Writing
    - Capture information and data
    - Transcribe information from one source to another
- Functional skills: Speaking, listening and communicating
    - Actively listen
    - Use oral communication methods to obtain and clarify information and data on animals

Maths

- GCSE: Number
    - Estimate resources required to complete activities
    - Calculate the amounts and volumes of materials required
- GCSE: Geometry and measures
    - Measure lines and areas of environments and materials
- Functional skills: Using numbers and the number system
    - Estimate resources required to complete activities
    - Calculate the amounts and volumes of materials required
- Functional skills: Measures, shape and space
    - Measure lines and areas of environments and materials

Annex: Glossary

Term	Description
Behaviours	The behaviours included are enabling attributes and attitudes identified by employers as important to industry and to achieving the outcomes. They are taken from the list developed for T Levels, available from the Operating Instructions for the Creation of Outline Content Annex E. Most of the behaviours have been included as supplementary information for providers in designing teaching and learning. Those that can be assessed in context have been incorporated into the skills to be assessed. These are: “self-reflecting” and “self-managing”.
Content	The national technical outcomes set out at a high level, the minimum content needed to demonstrate the outcomes for the specified route. The content includes the outcomes, all knowledge and skills topic area headings and the underpinning bullets.
English, maths and digital	There are English (communication), maths (numeracy) and digital topic areas in the knowledge and skills where they are required to achieve the outcome and must be covered in the qualification. Supplementary information provides mapping and references to relevant English, maths and digital qualification subject content. This is to support naturally occurring opportunities for these skills to be developed and applied in context, to help consolidate students’ learning and understand their relevance and value to industry. The mapping references relate to qualification subject content from: • GCSE English language • GCSE mathematics • Functional Skills English • Functional Skills mathematics • Functional Skills Qualifications - digital subject content
Holistic delivery	Holistic delivery involves integrated learning so that students make connections between skills, knowledge and understanding from across the programme.
Illustrative examples of breadth and depth	Illustrative examples of how breadth and depth could be introduced into teaching and learning. Developing breadth – supports the consolidation of knowledge and skills at the same level, by applying concepts, facts and theories to different contexts. Developing depth – provides stretch and challenge to move students towards the next level, by analysing information and ideas from across the contexts, to draw conclusions and make judgements.

Term	Description
Knowledge and understanding	The knowledge content included in each outcome includes both knowledge and understanding, which relate to the theoretical facts, principles, concepts, procedures and techniques that students should acquire.
Outcomes	The national technical outcomes describe what the student should be able to do by the end of the programme. They encompass: • the activities that students will undertake to demonstrate their learning • the content (knowledge and skills) being taught and learnt • the knowledge, skills and behaviours being developed in students. Most outcomes include both knowledge and skills. The Agriculture, environmental and animal care and Health and science routes include an outcome with knowledge only.
Rationale	This is the reasoning for the content. There is an introductory rationale for each set of national technical outcomes and a rationale for each outcome.
Route	The Sainsbury Review set out 15 routes structuring occupations across the labour market that require technical education. There are T Levels for 12 Technical Education routes.
Route-based approach	There is one set of national technical outcomes for each of the 12 T Level routes, rather than each T Level or occupational specialism. This is to enable progression to any T Level within the route.
Route-based project	T Level Foundation Year students are expected to complete a small project relevant to their route. A resource is available to help education providers design and deliver effective route-based projects.
Skills	There are different types of skills included in the national technical outcomes: • Technical skills – which are occupation-specific, mostly practical skills. These may vary widely between industry, sector, occupation and job type. • Employability or transferable skills – which correspond to those developed for T Levels, examples of which are available from the Operating Instructions for the Creation of Outline Content Annex E. Also included are English, maths and digital skills which appear under Communication, Numeracy and Digital headings.
Topic areas	The topic areas are the headings which set out, at a high level, the key underpinning knowledge and skills areas required to demonstrate the outcome.

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