

Pearson BTEC Level 1 Introductory in Engineering



Specification

First teaching from September 2019

Pearson BTEC Level 1 Introductory Award in Engineering
Pearson BTEC Level 1 Introductory Certificate in Engineering
Pearson BTEC Level 1 Introductory Diploma in Engineering

Issue 4

**Pearson
BTEC Level 1 Introductory
Award in Engineering**

**Pearson
BTEC Level 1 Introductory
Certificate in Engineering**

**Pearson
BTEC Level 1 Introductory
Diploma in Engineering**

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Edexcel, BTEC and LCCI qualifications

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This specification is Issue 4. We will inform centres of any changes to this issue. The latest issue can be found on our website.

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Welcome

With a track record built over 30 years of learner success, BTEC qualifications are widely recognised and respected. They provide progression to the workplace either directly or via study at higher levels. Proof comes from YouGov research, which shows that 62% of large companies have recruited employees with BTEC qualifications.

Why are BTECs so successful?

BTECs embody a fundamentally learner-centred approach to the curriculum, with a flexible, unit-based structure. In this new BTEC Introductory Suite, the focus is on the development of both transferable and sector skills. The development of these skills is key in helping progression to further study – whether that be to other BTECs, to apprenticeships or to training. As we expect many learners to be studying functional skills or GCSEs alongside their BTEC we also offer support skills in English and maths.

When creating the BTEC Introductory Suite, we worked with colleges to ensure that learners' needs were met. The colleges told us that it is essential that Level 1 learners develop key progression skills in areas such as problem solving, communication and research.

We have addressed this through:

- offering a BTEC Introductory Award, a BTEC Introductory Certificate and a BTEC Introductory Diploma, each has a clear and distinct purpose, so there is something to suit every learner's choice of study programme and progression plan
- new skills-focused content closely aligned with what centres need in supporting their learners to become part of a skilled workforce
- graded assessments in every unit to help learners progress to the next stage of their personal journey, whether to further education or to the world of work.

A word to learners

Today's BTEC Introductory qualifications will demand a lot of practical work from you. You will complete a range of units, be organised, take assessments that will demonstrate your skills and keep a portfolio of your assignments. You can feel proud in achieving a BTEC because, whatever your plans, success in your BTEC Introductory Award, Certificate or Diploma will help you progress to the next stage of your learning.

Good luck, and we hope you enjoy your course.

Summary of BTEC Level 1 Introductory Award, Certificate and Diploma in Engineering Issue 3 changes

Summary of changes made between the previous issue and this current issue	Page number
The TQT value for the Pearson BTEC Level 1 Introductory Certificate in Engineering has been updated.	Page 2
The wording under Section 2 Structure (Pearson BTEC Level 1 Introductory Award in Engineering) has been updated. The previous sentence contained incorrect information.	Page 8

If you need further information on these changes or what they mean, contact us via our website at: qualifications.pearson.com/en/support/contact-us.html.

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Overview of the BTEC Introductory qualifications

This specification contains the units and information you need to deliver the new Pearson BTEC Level 1 Introductory Award, Certificate or Diploma in Engineering. It includes all the units for these qualifications. This specification also signposts additional handbooks and policies.

These qualifications are part of the new suite of BTEC Introductory qualifications offered by Pearson. This suite has been designed for pre-16 to 19+ learners who wish to achieve at Level 1 qualification in preparation for future study. The qualifications are not designed to lead directly to employment but will maximise opportunities for learners to progress by focusing on the development of transferable and sector-related skills. The qualifications have been designed explicitly to meet the needs of this group of learners in terms of content, assessment and progression. For learners who do not want to specialise in one particular sector, we offer a Vocational Studies qualification in the Award, Certificate and Diploma sizes. The Vocational Studies qualification gives learners the opportunity to study units from across the sectors.

The qualifications have been created in line with the ethos and recommendations of study programmes for pre-16 to 19+ year olds and recommendations from centres. The qualifications are designed to meet Ofqual requirements.

All qualifications across the suite share common core units as these units contain the generic attributes learners need to be able to progress to further study. The qualification titles are given below with the size of the qualification in guided learning hours (GLH).

These new graded qualifications provide a broad introduction to a sector and give learners the opportunity to demonstrate increased skill levels. Learners will develop the necessary transferable and sector skills to progress more quickly. The qualifications prepare learners for progression to Level 2 BTECs or other study programmes. They provide for progression by either meeting entry requirements in their own right or by being accepted alongside other qualifications at the same level and adding value to them, typically alongside maths and English studies.

In the engineering sector the qualifications are:

Pearson BTEC Level 1 Introductory Award in Engineering (70 GLH)
(Qualification Number 603/5004/0)

Pearson BTEC Level 1 Introductory Certificate in Engineering (180 GLH)
(Qualification Number 603/1322/5)

Pearson BTEC Level 1 Introductory Diploma in Engineering (360 GLH)
(Qualification Number 603/1321/3).

The information in this specification is correct at the time of publication.

Qualifications, sizes and purposes at a glance

Title	Size and structure	Summary purpose
Pearson BTEC Level 1 Introductory Award in Engineering	70 GLH Two units must be achieved, of which one must be taken from Core Skills (Group A), Developing a Personal Progression Plan and one unit from the sector options (Group B).	Designed for learners wishing to gain an introduction to a chosen vocation area. The Award offers the opportunity for learners to study a sector unit and plan for their next steps by completing the mandatory unit: <i>Developing a Personal Progression Plan</i> .
Pearson BTEC Level 1 Introductory Certificate in Engineering	180 GLH Five units must be achieved, of which two must be taken from the Core Skills (Group A), and three from Sector Skills (Group B).	Designed for learners who may be ready to progress quickly to further study, the Certificate offers a basic introduction to the engineering sector. It could form part of a study programme that includes other appropriate subjects such as English and maths.
Pearson BTEC Level 1 Introductory Diploma in Engineering	360 GLH Ten units must be achieved, of which four must be taken from the Core Skills (Group A), and six from Sector Skills (Group B).	Designed to be taken over one year, giving learners the opportunity to develop a range of skills in the engineering sector and supporting progression to further study. It could be a substantial vocational qualification within a study programme that includes other appropriate subjects such as English and maths.

Total Qualification Time

For all regulated qualifications, Pearson specifies a total number of hours of study that it is expected learners will be required to undertake in order to complete the qualification: this is the Total Qualification Time (TQT). This is calculated for the average learner. Within TQT, Pearson identifies the number of Guided Learning Hours (GLH) that we expect a centre delivering the qualification to provide.

Guided learning means activities such as lessons, tutorials, supervised study and supervised assessments, that directly involve tutors and assessors in teaching, supervising and invigilating learners. TQT includes other required learning such as private study, preparation for assessment and undertaking assessment when not directly under supervision.

The Pearson BTEC Level 1 Introductory Award in Engineering is a qualification having:

- Total Qualification Time: 80 hours
- Guided Learning: 70 hours.

The Pearson BTEC Level 1 Introductory Certificate in Engineering is a qualification having:

- Total Qualification Time: 200 hours
- Guided Learning: 185 hours.

The Pearson BTEC Level 1 Introductory Diploma in Engineering is a qualification having:

- Total Qualification Time: 400 hours
- Guided Learning: 360 hours.

Centres should take note of these hours in planning their programme but may use their professional judgement to determine the provision of guided learning and study time across the units.

Qualification and unit content

Pearson has developed the content of the new BTEC Introductory qualifications through consultation with further education representatives and other centres that deliver qualifications at this level. This has helped us to design qualifications with a focus on skills development rather than knowledge, therefore avoiding duplication of learning at a higher level and focusing on the broader skills that learners need for progression.

The purpose of these qualifications is to develop the transferable skills, attributes and behaviours needed for learners to progress to further study and ultimately to employment. The qualifications are designed to be delivered in an applied way, bringing together appropriate content with practical and technical skills.

As a Level 1 qualification, the pass standard requires learners to complete routine, simple and directed tasks by applying their knowledge and skills. It is expected that learners complete tasks fully under supervision, direction or with guidance. At merit and distinction levels, learners may be expected to complete tasks in greater detail or with greater confidence or independence.

Transferable skills coverage

The development of transferable and sector skills is the main focus. We intend for every learner to have the opportunity to develop key transferable skills through both core and sector units. This will help learners to appreciate how the transferable skills they develop in their core units can be contextualised in the sector they are studying. On completion of their course, learners will have developed a set of transferable and sector skills that will benefit them whatever their chosen progression route. The transferable skills covered in the units are summarised in the grid below.

Communication <ul style="list-style-type: none">• Writing, speaking and listening to others• Using body language to help communication• Using communication for different purposes• Communicating in a variety of ways, including electronic and social media
Working with others <ul style="list-style-type: none">• Setting common goals• Showing respect for others in the team and valuing their contributions• Listening to others in the team, being open minded• Taking on roles and responsibilities
Problem solving <ul style="list-style-type: none">• Identifying issues by being able to examine information• Dealing with change• Decision making to find solutions• Staying with a problem until it is resolved• Using IT to help solve problems
Managing information <ul style="list-style-type: none">• Collecting and using information from different sources• Determining relevance and accuracy of information• Organising information• Representing information in different ways• Using IT to present and store information
Self-management and development <ul style="list-style-type: none">• Setting goals and planning ahead• Being proactive and flexible• Being resilient and able to work under pressure• Monitoring performance and devising strategies for improvement• Using IT for time management

Sector skills coverage

The sector units introduce learners to some broad sector skills and to some underpinning knowledge of a vocational sector. This will help learners to prepare for progression and ensures that the approach to delivery is practical, active, contextualised and skills based.

Functional skills

The units in this specification signpost opportunities for learners to develop functional skills in English and mathematics.

Assessment

Assessment is designed to fit the purpose and objective of the qualification and all units are internally assessed – giving learners the opportunity to demonstrate skills developed in applied scenarios. There is a range of assessment styles suited to skills- and sector-based qualifications at this level. All units are graded to encourage skills development and performance.

These qualifications consist of two types of unit. Group A units are the core skills units, they cover content designed to reflect the skills and behaviours needed to progress to further study. Group B units are made up of sector units containing sector-specific content to enable learners to develop sector-specific skills and some knowledge to support progression to the next stage of vocational learning.

Units from Group A and Group B may assess the same transferable skills. Where this occurs, you may opt to deliver these units simultaneously. This is acceptable providing the delivery is planned appropriately and that all learning aims for both types of unit are met and covered in the assessment. You are not permitted to deliver a unit and then use the learner's evidence from the unit to achieve another unit.

Internally-assessed units

All units in these qualifications are internally assessed and subject to external standards verification. This means that you set and assess the assignments that provide the final summative assessment for each unit – you can use the examples and support that we give in the units. If you are not an approved centre already, before you assess you will need to become one in order to register learners. You will need to prepare to assess using the guidance in *Section 7*.

In line with the requirements and guidance for internal assessment, you select the most appropriate assessment styles according to the learning set out in the unit. This ensures that learners are assessed using a variety of styles to help them develop a broad range of transferable skills. Learners could be given opportunities to:

- carry out practical tasks
- present information that they have gathered
- keep working logbooks, records and reflective journals
- practise English and mathematical skills
- take part in oral or written presentations
- take part in role play, interviews and other activities.

You will make grading decisions based on the requirements and supporting essential guidance given in the units. See *Section 5* for rules on resubmission and retakes.

Language of assessment

Assessment of the internal units for these qualifications will be available in English. All learner work must be in English. A learner taking the qualifications may be assessed in British sign language where it is permitted for the purpose of reasonable adjustment. For information on reasonable adjustments see *Section 6*.

Grading for units and qualifications

Units are assessed using a grading scale of Distinction, Merit, Pass and Unclassified. Grading has been introduced at this level as a result of feedback from users and practitioners of BTEC qualifications.

All units contribute proportionately, based on the Guided Learning (GLH) to the overall qualification grade.

Qualifications in the suite are graded using a scale of P to D, **or** PP to DD. Please see *Section 9* for more details. The relationship between qualification grading scales and unit grades will be subject to regular review as part of Pearson's standards monitoring processes on the basis of learner performance and in consultation with key users of the qualifications.

1 Qualification objectives and purpose

Pearson BTEC Level 1 Introductory Award, Certificate and Diploma in Engineering

In this section you will find information on the purpose of the qualifications and how their design meets that purpose. On our website we publish a Statement of Purpose for each qualification. These Statements are designed to guide you and potential learners to make the most appropriate choice about which qualification is most suitable at recruitment.

What is the purpose of these qualifications?

The Pearson BTEC Level 1 Introductory Award, Certificate and Diploma in Engineering are designed around practical skills and tasks that place an emphasis on learners demonstrating what they can do rather than what they know in theory. The qualifications give learners the opportunity to acquire and develop generic, transferable and sector-specific skills in order to complete tasks and demonstrate a level of achievement that enables them to progress to further learning.

The Award offers a taster of the early years sector and could be studied alongside other subjects.

The Certificate offers a basic introduction to the engineering sector and could be studied alongside other subjects within a study programme.

The Diploma gives learners the opportunity to develop a broader range of skills in the engineering sector.

Who are these qualifications for?

The Pearson BTEC Level 1 Introductory Award, Certificate and Diploma in Engineering are primarily for all learners who want to continue their education and develop their skills for progression to further learning and, ultimately, to employment.

The Award is designed for learners who may want to study a sector unit and plan their next steps by completing the Developing a Personal Progression Plan unit.

The Certificate is designed for learners who may be ready to progress quickly to further study.

The Diploma is designed to be taken over one year, as a substantial vocational qualification within a study programme.

What do these qualifications cover?

The content of these qualifications has been developed in consultation with further education colleges and other providers to ensure that the qualifications support progression to further learning and training. All learners taking these qualifications will study core units that focus on key transferable skills such as research and planning, time management and working with others. Learners will also take a number of sector units. The content of the sector units offers a broad introduction to the skills and knowledge within that sector, allowing the delivery to be practical and active in order to engage learners. For engineering, the units cover content such as electrical installation, using hand tools and machining processes to manufacture products and components and producing engineering drawings using computer-aided design (CAD).

What could these qualifications lead to?

These qualifications prepare learners for further learning at a higher level in engineering.

The development of transferable skills means that learners can also choose a study programme from alternative sectors. For example, these qualifications in engineering could lead to Pearson BTEC Level 2 qualifications in this sector, or to Level 2 qualifications in other sectors.

How do these qualifications enable learners to progress?

The mode of delivery and assessment in the units is designed to build awareness of a sector and the skills required to work in it. Learners will be given contexts and scenarios to help them develop skills and to acquire knowledge through application. Learners will not develop all the knowledge and skills needed to enter the labour market in a given sector but will develop pre-employability skills and contextualised knowledge to allow them to progress to further learning and training and, ultimately, to become successful in their chosen sector.

The Award, Certificate and Diploma both contain a mandatory unit, *Unit A2: Developing a Personal Progression Plan* that enables learners to consider their next steps in learning.

How do the Certificate and Diploma sizes differ in purpose?

The Award is suitable for learners studying part time or for those who want an introduction to a vocational qualification alongside other qualifications and activities as part of their study programme.

The Certificate is suitable for learners studying part time or for those who wish to study a vocational qualification alongside other qualifications and activities as part of their study programme.

The Diploma is twice the size of the Certificate and will form a substantial element of a learner's study programme. By providing a broader sector experience, the Diploma will suit learners who have a clear indication of the sector they wish to study further. The Diploma encourages learners to take on some individual research, enabling them to be further prepared for higher-level learning.

2 Structure

Pearson BTEC Level 1 Introductory Award in Engineering

Two units must be achieved, one of which must be Developing a Personal Progression Plan (Group A) and one unit from the sector options (Group B)

Pearson BTEC Level 1 Introductory Award in Engineering			
Unit reference	Unit title	GLH	Type
Core	Group A units – learners must complete this unit		
A2	Developing a Personal Progression Plan	30	Core
Sector	Group B units – learners must complete one unit from this group		
ENG5	Manufacturing an Engineered Product Using Hand Tools	40	Sector
ENG6	Manufacturing a Component Using Machining Processes	40	Sector
ENG7	Using a Welding Process to Join Materials	40	Sector
ENG8	Assembling Electronic Circuits	40	Sector
ENG9	Carrying Out Routine Mechanical Servicing of Equipment	40	Sector
ENG10	Carrying Out an Electrical Installation	40	Sector
ENG11	Producing Engineering Drawings Using CAD	40	Sector
ENG12	Carrying Out Routine Service Tasks on a Motor Vehicle	40	Sector

Pearson BTEC Level 1 Introductory Certificate in Engineering

Learners must complete both core units and three sector units.

Pearson BTEC Level 1 Introductory Certificate in Engineering			
Unit reference	Unit title	GLH	Type
Core	Group A units – learners must complete both units		
A1	Being Organised	30	Core
A2	Developing a Personal Progression Plan	30	Core
Sector	Group B units – learners must complete three units		
ENG5	Manufacturing an Engineered Product Using Hand Tools	40	Sector
ENG6	Manufacturing a Component Using Machining Processes	40	Sector
ENG7	Using a Welding Process to Join Materials	40	Sector
ENG8	Assembling Electronic Circuits	40	Sector
ENG9	Carrying Out Routine Mechanical Servicing of Equipment	40	Sector
ENG10	Carrying Out an Electrical Installation	40	Sector
ENG11	Producing Engineering Drawings Using CAD	40	Sector
ENG12	Carrying Out Routine Service Tasks on a Motor Vehicle	40	Sector

Pearson BTEC Level 1 Introductory Diploma in Engineering

Learners must complete all core units and six sector units.

Pearson BTEC Level 1 Introductory Diploma in Engineering			
Unit reference	Unit title	GLH	Type
Core	Group A units – learners must complete all units		
A1	Being Organised	30	Core
A2	Developing a Personal Progression Plan	30	Core
A3	Working with Others	30	Core
A4	Researching a Topic	30	Core
Sector	Group B units – learners must complete six units		
ENG5	Manufacturing an Engineered Product Using Hand Tools	40	Sector
ENG6	Manufacturing a Component Using Machining Processes	40	Sector
ENG7	Using a Welding Process to Join Materials	40	Sector
ENG8	Assembling Electronic Circuits	40	Sector
ENG9	Carrying Out Routine Mechanical Servicing of Equipment	40	Sector
ENG10	Carrying Out an Electrical Installation	40	Sector
ENG11	Producing Engineering Drawings Using CAD	40	Sector
ENG12	Carrying Out Routine Service Tasks on a Motor Vehicle	40	Sector

3 Units

Understanding your units

The units in this specification set out our expectations of assessment in a way that helps you to prepare your learners for assessment.

Each unit in the specification is set out in a similar way. This section explains how the units work. It is important that all tutors, assessors, internal verifiers and other staff responsible for the programme read and are familiar with the information given in this section.

Section	Explanation
Unit number	The numbering of the core units is sequential from A1–A4. The numbering of the sector units is preceded by an abbreviation of the sector plus the number of the unit, e.g. HSC1, HSC2 2.
Unit title	This is the formal title used and it appears on certificates.
Level	All units are at Level 1 as outlined in the Ofqual level descriptors.
Unit type	This shows whether a unit is a core or sector unit. See structure information in <i>Section 2</i> for full details.
GLH	Units may have a value of 30 or 40 Guided Learning Hours GLH. This indicates the number of hours of teaching, directed activity and assessment expected.
Unit in brief	A brief formal statement of the content and the skills learners will develop through the unit. You can use this in summary documents, brochures etc.
Unit introduction	This is designed with learners in mind. It indicates why the unit is important, how learning is structured and how learning might be applied when progressing to further education.
Unit summary	This section helps tutors to see at a glance the main content and skills in the unit presented against the learning aims. The suggested assessment evidence is suitable to fulfil the requirements of the unit.
Functional skills	This table summarises opportunities for functional skills development in the unit.
Unit content	This section sets out the required teaching content of the unit. Content is compulsory except when an 'e.g.' is given. Learners should be asked to complete summative assessment only after the teaching content for the unit has been covered.
Learning aims	Learning aims help to define the scope and style of learning of the unit. They define the context within which the learner develops their skills and how they will demonstrate those skills.
Assessment criteria	Each learning aim has assessment criteria to explain the achievement required to obtain Pass, Merit and Distinction grades. A glossary of the terms used in the assessment criteria is given in <i>Appendix 1</i> . All assessors need to understand our expectations of the terms used.

Section	Explanation
Essential information for assessment decisions	This section gives holistic guidance on the learning aims and associated assessment criteria. It explains what the learner must provide as evidence to reach the Pass, Merit and Distinction standard. This section also gives examples and clarification.
Essential resources	This section lists specific resources that are essential for teaching and assessing the unit. For information on support resources see <i>Section 10</i> .
Delivery guidance	This section gives suggestions of ways of delivering the unit. It offers ideas of practical activities in sector contexts that can be used to help develop relevant skills and to encourage learner progress.
Suggested assessment activity	This section suggests scenarios and tasks that can be used in summative assessment activities.

Index of units

This section contains all the units developed for these qualifications. Please refer to *page 8* to check which units are available for the engineering qualifications.

Unit A1: Being Organised	15
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Unit ENG7: Using a Welding Process to Join Materials	67
Unit ENG8: Assembling Electronic Circuits	77
Unit ENG9: Carrying Out Routine Mechanical Servicing of Equipment	85
Unit ENG10: Carrying Out an Electrical Installation	93
Unit ENG11: Producing Engineering Drawings Using CAD	103
Unit ENG12: Carrying Out Routine Service Tasks on a Motor Vehicle	111

Unit A1: Being Organised

Level: **1**

Unit type: **Core**

Guided learning hours: **30**

Unit in brief

Learners will develop key techniques to help organise their work and priorities and manage their time effectively.

Unit introduction

How often do you run out of time to do tasks? Do you ever miss the bus or turn up late for college? Being organised and being able to manage your time is essential for success in your education.

From creating to-do lists and filing systems to setting up your phone for alerts and alarms, this unit will introduce you to ways that will help you to plan and use your time effectively, as well as organising yourself and your work. After learning and practising these techniques, you will have the opportunity to put them into practice over a period of time, reviewing how successful they were and whether they improved your organisational skills.

The skills you learn in this unit are key for progression to the next stage in your education. They are also crucial for work and life.

Learning aims

In this unit you will:

- A** Explore techniques to improve own organisational skills
- B** Review the use of techniques to improve own organisational skills.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Explore techniques to improve own organisational skills	<ul style="list-style-type: none"> Techniques to improve organisation 	<ul style="list-style-type: none"> A planner for a two-week period. Supporting documentation that demonstrates the techniques used.
B Review the use of techniques to improve own organisational skills		
Key teaching areas include:		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> This unit can be delivered in a sector context. 	<ul style="list-style-type: none"> Organisational skills Time management Use of ICT management tools 	<ul style="list-style-type: none"> Planning Managing information

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> Write clearly and coherently, including an appropriate level of detail. Ensure written work includes generally accurate punctuation and spelling, and that meaning is clear.
Maths	<ul style="list-style-type: none"> Solve problems requiring calculations with common measures, including time and money.

Unit content

Knowledge and sector skills

Techniques to improve organisation

Learners will practice skills and techniques to improve their organisation over a period of time before final assessment.

- Time-management techniques:
 - produce daily or weekly to-do lists or action plans to meet deadlines
 - prioritise tasks
 - create a checklist of tasks that need to be completed, reviewing it regularly
 - consider how long each task might take
 - use free calendar software to keep timings of lessons and work
 - allow a little extra time in case longer is spent on one task than expected
 - foresee problems and plan ways to overcome them
 - review priorities.
- Organisational techniques:
 - ensure there is access to required resources to complete tasks such as notebooks, pens, laptops, tablets
 - use organisational stationery such as folders, dividers, highlighters
 - set up and manage a filing system of work and emails to allow for quick and easy access
 - use alerts on phones and other digital devices
 - use project plans and spreadsheets for organisation and budgeting
- Planners to organise time:
 - different types of planner such as wall planners, calendars, electronic and/or online planners
 - using them daily, weekly or monthly
 - keeping them updated and reviewing the priorities.
- Review own time-management and organisational skills through identifying:
 - strengths and weaknesses of techniques used
 - why some techniques worked better than others
 - ways to improve own time management and organisation.

Transferable skills

- Planning: using time-management techniques.
- Managing information: prioritising information received and using ICT to organise and manage time.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore techniques to improve own organisational skills		
A.P1 Use limited techniques to improve own organisational skills.	A.M1 Use appropriate techniques to improve own organisational skills.	A.D1 Use appropriate and effective techniques to improve own organisational skills.
Learning aim B: Review the use of techniques to improve own organisational skills		
B.P2 Identify the techniques used to improve own organisational skills, giving outline examples.	B.M2 Review the techniques used, giving some examples of how they improved own organisational skills.	B.D2 Review the techniques used, giving detailed examples of how they improved own organisational skills.

Essential information for tutors

Units from Group A and Group B may assess the same transferable skills. Where this occurs, you may opt to deliver these units simultaneously. This is acceptable providing the delivery is planned appropriately and that all learning aims for both types of unit are met and covered in the assessment. You are not permitted to deliver a unit and then use learners' evidence from the unit to achieve another unit.

Essential information for assessment decisions

For distinction standard, learners:

- demonstrate that they have tried out a full range of techniques to organise themselves. This could include evidence of prioritising tasks, to-do lists, action planning with detailed timings, screenshots of folder organisation and online calendar alerts, as well as time allocated for homework
- will review the success of the techniques they used, giving full examples of how they improved their own organisation, making some links on how they could use the techniques again.

For merit standard, learners:

- demonstrate that they have used a range of mostly suitable techniques for the tasks they have to complete. This could include evidence of to-do lists, some basic action planning with timings and perhaps some evidence of the use of ICT features to organise their time
- will provide a review that outlines the techniques used. They will give some relevant examples, demonstrating some reflection on how the use of these techniques improved their own organisation.

For pass standard, learners:

- demonstrate that they have used a small number of simple organisational techniques, e.g. to-do lists and phone alerts and perhaps some folder management
- will list the techniques they used and will provide some outline examples of how they may use them again.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Prioritising tasks

Learners begin this workshop in small groups to complete a task. Tutors can give different scenarios for each group to work with. Ideally, the tasks should be familiar topics to learners such as planning a shopping trip at the weekend. Learners will need to consider where they are going, how they will get there, what it will cost and how much time they have. Using the information, learners can then make a list of the tasks in order of priority and timing.

Suggested time: about 2 hours.

Planning your time

Tutors explain the importance of planning time to meet deadlines. Learners fill in a blank timetable page, identifying when their lessons are and when they have deadlines for work to be completed.

Suggested time: about 1 hour.

Use of own devices to help organisation

Tutors ask learners to investigate what they have on their phones or other devices that could help to organise their time. This could include phone alerts, free software or a calendar.

Suggested time: about 1 hour.

Filing and folders

Tutors talk through the importance of naming and labelling folders (electronic and hard copies) for ease of reference and access. This could be through colour coding, using stickers or labels. Learners work through their folders, using some of the filing and labelling techniques they have learned.

Suggested time: about 2 hours.

Using a planner to organise own time

Tutors talk through the various types of planner that could be used to organise own time such as wall planners, calendars, electronic and/or online planners. They also talk through how they can be used daily, weekly or monthly to prioritise key tasks and plan ahead.

In pairs, learners fill in a weekly planner for their partner, talking through what the key priorities are for the week for each of them and identifying ways to manage their time.

Each person presents the planner for their partner.

Suggested time: about 2 hours.

Meeting deadlines in your sector

Learners plan their time around the date for completing a particular activity or task on their course.

They make a list of key tasks and show how long each one could take. They then start at the hand-in date and work back to the beginning of the project.

Learners then use the plan and monitor its effectiveness as they progress through it. Learners should also build in contingencies and consider what obstacles there may be to prevent them achieving the end goal on time.

Suggested time: about 3 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

You have been asked to produce a planner for a set period of time during your course. The time period should be between two and four weeks. Your planner should identify days and times in the week that are blocked out for lessons, work, and sport and leisure activities. You should then demonstrate how you are going to organise yourself and the available time to complete all the tasks you need to in a given timeframe to ensure that you meet all the deadlines.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

Complete a study plan for a particular assignment or activity in your sector units.

Unit A2: Developing a Personal Progression Plan

Level: **1**

Unit type: **Core**

Guided learning hours: **30**

Unit in brief

Learners will develop the skills and behaviours needed to progress to the next stage in their learning, identifying progression opportunities and creating a plan to enable them to get there.

Unit introduction

What would you like to do when you finish this course? Perhaps you would like to spend more time learning about the subject you are studying at the moment? Or you may want to do something completely different. Before you decide what your next step is, you need to know what you are good at, what your interests are and what your end goal is.

This unit will help you find out what opportunities are available to you and how to get to the next stage. You will carry out a self-audit, identifying what your strengths are and what you need to develop to be able to meet your progression goals. You will learn how to set goals and plan ways to achieve them. You will then produce a personal progression plan to help you reach the next step in your life.

The skills you develop in this unit will be good preparation when applying for another course or training programme.

Learning aims

In this unit you will:

- A** Explore the skills and behaviours needed to meet personal progression goal
- B** Produce a progression plan to meet intended progression goal.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
<p>A Explore the skills and behaviours needed to meet personal progression goal</p>	<ul style="list-style-type: none"> • Benefits and purpose of developing a progression plan • Finding out about progression opportunities • Setting a progression goal • Identifying the skills and behaviours needed to meet progression goal • Reviewing own skills and behaviours against progression goal • Creating a progression plan 	<ul style="list-style-type: none"> • Audit of skills and behaviours. • Personal progression plan.
<p>B Produce a progression plan to meet intended progression goal</p>		
<p>Key teaching areas include:</p>		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> • Learners can reflect on the sector skills they have developed when considering their progression goal. 	<ul style="list-style-type: none"> • Sources of information about progression opportunities and requirements • Producing a progression plan 	<ul style="list-style-type: none"> • Written communication • Managing information

There are opportunities to develop functional skills in this unit:

Functional skills	
<p>English</p>	<ul style="list-style-type: none"> • Make relevant and extended contributions to discussions, allowing for and responding to others' input. • Prepare for and contribute to the formal discussion of ideas and opinions.

Unit content

Knowledge and skills

Benefits and purpose of developing a progression plan

- Gives direction and focus to short-term and long-term goals.
- Sets out the key steps to achieve progression goal.
- Allows for discussion with others, e.g. tutors, parents, peers.
- Gives time for reflection on what is achievable and realistic.

Finding out about progression opportunities

- Progression opportunities such as to further learning, work or apprenticeships.
- Local sources of information about potential progression routes such as colleges, careers fairs.
- Sources of advice and guidance for progression.
- Tutor advice.
- Careers advice.
- Entry requirements such as baseline entry qualifications, an entry interview, portfolio.

Setting a progression goal

- Matching own skills and behaviours with progression goals.
- Deciding on the next step, e.g. using SMART (specific, measurable, achievable, realistic, time-bound) targets.
- Using research findings to identify the requirements to meet goals.
- Setting a progression goal to work towards.

Identifying the skills and behaviours needed to meet progression goal

- Skills needed to meet progression goal:
 - transferable skills, e.g. communication, working with others, problem solving
 - employability skills, e.g. IT skills, being able to drive.
- Behaviours needed for progression goal, e.g. reliability, efficiency, being trustworthy.
- Qualifications needed for progression, e.g. level of English and maths.

Reviewing own skills and behaviours against progression goal

- Carrying out a self-audit of skills and behaviours using past experience of education and learning.
- Gathering feedback from others about own strengths and areas for improvement.
- Attitudes and behaviours needed for progression.

Creating a progression plan

To include:

- short-term and long-term progression goals
- identification of key activities needed to move towards the progression goal
- key actions to improve skills and behaviours
- key milestones to achieve goal, e.g. interview dates, application deadlines
- realistic timelines to meet goal.

Transferable skills

- Written communication: filling out application forms, progression plan.
- Managing information: from the sources used to find out about possible progression routes.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore the skills and behaviours needed to meet personal progression goal		
A.P1 Identify an intended progression goal.	A.M1 Identify a clear progression goal with some details of the skills and behaviours needed to achieve it.	A.D1 Identify a realistic progression goal with details of the skills and behaviours needed to achieve it.
A.P2 Outline the skills and behaviours needed to meet personal progression goal.	A.M2 Identify how own skills and behaviours meet personal progression goal.	A.D2 Describe how own skills and behaviours meet personal progression goal.
Learning aim B: Produce a progression plan to meet intended progression goal		
B.P3 Produce an outline progression plan to meet intended progression goal.	B.M3 Produce a clear progression plan, identifying some steps towards meeting intended progression goal.	B.D3 Produce a detailed and achievable progression plan, identifying most of the steps needed to meet intended progression goal.

Essential information for tutors

Units from Group A and Group B may assess the same transferable skills. Where this occurs, you may opt to deliver these units simultaneously. This is acceptable providing the delivery is planned appropriately and that all learning aims for both types of unit are met and covered in the assessment. You are not permitted to deliver a unit and then use learners' evidence from the unit to achieve another unit.

Essential information for assessment decisions

For distinction standard, learners:

- set a progression goal that demonstrates evidence of focused research from different sources, showing a clear and detailed understanding of the skills and behaviours needed to achieve it
- carry out an insightful review of own skills and behaviours, using feedback from others and evidence of self-reflection on how own skills and behaviours match those needed to meet the progression goal
- produce a focused progression plan that gives details on the required skills, behaviours and qualifications and produce a detailed plan on the next steps needed to meet the progression goal.

For merit standard, learners:

- set a focused progression goal that demonstrates evidence of finding out information from different sources, showing some understanding of the skills and behaviours needed to achieve it
- carry out a review of own skills and behaviours, using some feedback from others and give some detail on how own skills and behaviours match those needed for the progression goal
- produce a coherent progression plan that outlines some of the skills, behaviours and qualifications needed to meet the goal and covers most of the steps needed to achieve it.

For pass standard, learners:

- set a broad progression goal that shows limited evidence of finding out information from sources
- list the skills and behaviours needed to meet the goal
- produce a basic progression plan that gives broad and unfocused information on how they intend to meet their progression goal.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

What are my progression opportunities?

In groups, learners discuss the progression opportunities that may be available to them. This can be supported by handouts about the local colleges, links to apprenticeship websites and local jobsites.

As a whole group, the progression opportunities can be listed on the board and the group can discuss what their initial ideas/plans are for the next stage.

Suggested time: about 1 hour.

Skills audit

Learners identify their own skills using a number of different techniques. They could list their own ideas first and then use commercially designed paper-based or online questionnaires. Ideally, learners should have the chance to do both. They can then compare results.

Learners list their skills in order of confidence. If the group know each other well, they could share their list with others to find out their opinion.

Suggested time: about 3 hours.

Appropriate behaviours for progression

Learners could begin the session by watching a video clip of people demonstrating different attitudes and behaviours. The group can then identify different attitudes and behaviours and talk about how they can affect other people's attitudes towards them.

Learners could role-play different scenarios that highlight the influence attitudes and behaviours can have on others, e.g. employers.

Suggested time: about 3 hours.

Local sources of information to identify progression opportunities

In small groups, learners carry out local research to find out where and how they can find out about progression opportunities. They could research online local newspapers and magazines, visit the library or careers service, websites, advice and guidance etc. Learners can collate their information to share with others in the class.

Suggested time: about 3 hours.

Opportunities to develop the skills and behaviours needed to progress

Tutors could invite speakers to talk about the value of volunteering and the skills that learners can develop, e.g. working in a charity shop, running a 5k and getting sponsors, being a youth leader, taking part in the Duke of Edinburgh's Award (DofE) scheme or sport's coach.

Suggested time: about 3 hours.

Setting goals

Learners will find out how to set simple goals that are achievable. Tutors could begin by helping learners set day-to-day goals, e.g. what they are planning to do that evening. Initially learners only need to set clear, achievable goals, however it will be valuable to consider measures and timescales.

Tutors can provide a list of potential goals and learners have to decide if they are clear and achievable.

Suggested time: about 3 hours.

Matching skills and behaviours to progression opportunities

Tutors give a range of course details, job advertisements and job descriptions for learners to review. Learners can then match their skills to the relevant course or job. They could initially work in small groups to identify the information they need from the text. Following the matching exercise, they can then decide if it would be realistic to apply for the course or job, if they would need to develop other skills before they could apply or if the course or job is not appropriate.

Suggested time: about 3 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

You have been asked to attend a progression interview with your tutor to discuss the next step in your learning. In preparation for this, you need to research the possible progression opportunities available to you. You should decide on one opportunity to focus on and produce an outline of the skills and behaviours needed for that particular progression goal and then match your own skills and behaviours to the goal. You should then produce a detailed progression plan, identifying the key areas you need to develop in order to meet your progression goal. Both of these documents will form a basis for the discussion with your tutor.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

You will need to produce a new audit and progression plan for a different progression opportunity.

Unit A3: Working with Others

Level: **1**

Unit type: **Core**

Guided learning hours: **30**

Unit in brief

Learners will develop skills in communication, teamwork and problem solving that will enable them to work effectively with other people on a given activity.

Unit introduction

A key part of being successful in work and study is the ability to work with other people. This includes being able to communicate, working together to solve problems and working in teams to achieve common goals.

In this unit, you will develop these skills and demonstrate how you use them. You will work with others to complete a given activity, agree roles and responsibilities, share ideas and support each other. Problems may come up as you work on the activity and you will need to find solutions to them. It can be difficult working with others and this unit gives you the opportunity to develop the skills and behaviours you need to be successful.

The skills you learn in this unit can be applied throughout your sector units and in broader contexts.

Learning aims

In this unit you will:

- A** Demonstrate the ability to work with others on a given activity
- B** Review own and others' performance on a given activity.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Demonstrate the ability to work with others on a given activity	<ul style="list-style-type: none"> Communicating with others Working with others to achieve common goals Carrying out an outline review of own and others' performance 	<ul style="list-style-type: none"> A log/blog that provides evidence of: <ul style="list-style-type: none"> role in a set activity where they have worked with others review of the activity. Witness statement from tutor.
B Review own and others' performance on a given activity		
Key teaching areas include:		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> This unit can be delivered in a sector context. 	<ul style="list-style-type: none"> Ways to communicate effectively through listening and talking Building effective teams Ways to assess own performance How to plan to improve own performance 	<ul style="list-style-type: none"> Verbal communication Teamwork Problem solving

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> Make relevant and extended contributions to discussions, allowing for and responding to others' input. Make different kinds of contributions to discussions.

Unit content

Knowledge and sector skills

Communicating with others

- Taking part in discussions to decide ways to complete activity.
- Consideration of own verbal communication when working with others.
- Listening and responding appropriately to others.
- Contributing ideas and points of view.
- Accepting and giving positive and negative feedback.

Working with others to achieve common goals

- Identifying individual roles and responsibilities.
- Ensuring clear communication throughout the activity.
- Knowing appropriate behaviours for different situations.
- Working through problems and agreeing solutions together.
- Importance of respecting others who are working with you.
- Reviewing team and personal performance.
- Solving issues in teams.

Carrying out an outline review of own and others' performance

- Identifying own strengths in activity.
- Receiving feedback about own performance.
- Giving feedback to others on their performance.
- Outlining ways to improve own performance when working with others.

Transferable skills

- Verbal communication: working with others.
- Teamwork: working with others to complete an activity or achieve a goal.
- Problem solving: working together to overcome problems.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Demonstrate the ability to work with others on a given activity		
A.P1 Demonstrate limited communication skills when working with others to complete a given activity.	A.M1 Demonstrate appropriate communication skills when working with others to complete a given activity.	A.D1 Demonstrate effective communication skills when working with others to complete a given activity.
A.P2 Undertake an activity with others, taking some responsibility for own role within it.	A.M2 Undertake an activity with others, taking responsibility for own role within it.	A.D2 Undertake an activity with others, taking full responsibility for own role and making effective contributions.
Learning aim B: Review own and others' performance on a given activity		
B.P3 Produce an outline review of own performance during an activity.	B.M3 Review own performance during an activity, identifying own strengths and weaknesses, with reference to feedback.	B.D3 Review own performance during an activity, making suggestions for the future, with detailed reference to feedback.
B.P4 Deliver positive feedback to others that is relevant to the activity.	B.M4 Deliver positive and negative feedback to others, using examples from the activity.	B.D4 Deliver constructive feedback to others, using relevant examples from the activity.

Essential information for tutors

Units from Group A and Group B may assess the same transferable skills. Where this occurs, you may opt to deliver these units simultaneously. This is acceptable providing the delivery is planned appropriately and that all learning aims for both types of unit are met and covered in the assessment. You are not permitted to deliver a unit and then use learners' evidence from the unit to achieve another unit.

Essential information for assessment decisions

For distinction standard, learners:

- work with others successfully, taking ownership of their role in the activity and completing all their own activities while supporting others to achieve the team goal. Their communication skills will be clear and they will be understood by other members of their group to drive the activity forward. They will listen and respond to others, showing respect for their views
- complete a detailed review of their own performance during the activity. This could be written or a verbal recording that gives a detailed overview of the activities they completed. They will describe how they would work with others in the future, using supported examples from feedback they received from others. They will also demonstrate the ability to give positive and negative feedback to their peers in a clear and helpful way, using full examples from the activity.

For merit standard, learners:

- generally work well with others, taking responsibility for their own role in the activity and communicating with others when required, using appropriate language and demonstrating some ability to listen to the views of others
- complete a review of their own performance during the activity. This could be written or a verbal recording which identifies some of their strength and weaknesses, making some reference to the feedback they received from others. They will also demonstrate the ability to give some positive and negative feedback to their peers, using simple examples from the activity.

For pass standard, learners:

- show some ability to work with others, taking some responsibility for their own role in a activity, but not necessarily seeing the activities through to the end. Their communication with others may be minimal and only when necessary
- complete an outline of the role they carried out during the activity. This could be written or a verbal review with minimal attempt to review their own performance. They will attempt to give positive feedback to their peers, although this may be very basic and not linked to concrete examples from the activity.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

What makes a good team?

Tutors ask for examples from the group of any good and effective teams they can think of. For example, it could be the local netball team, a dance group or a professional football club. Smaller groups then choose one example from the list and identify two traits that make the team work well together. Examples could be:

- communication
- working together to solve problems
- understanding each other's roles and responsibilities.

Each group has to decide on the two traits they want to feed back to the group. Tutors list them all and then highlight the most prominent. Tutors ask how easy it was to decide as a group on the two traits they had to feed back on.

The group then discuss their experiences of working with others in the past, reflecting on their behaviours and making suggestions on how their team could have worked better.

Suggested time: about 1 hour.

What makes a bad team?

Tutors ask the group for examples of where they have seen or experienced bad teamwork, or of people not working well together. The group discuss the reasons why the team didn't work well together.

Tutors then show examples of bad teamwork, from TV shows like *The Apprentice* or *Big Brother*.

While the clips are being shown, the group write down everything they think has made the team not work properly. They then share their ideas with the whole group.

The whole group then reflects on the benefits of working well with other people and how they have to sometimes modify their behaviour to work effectively with other people.

Suggested time: about 1 hour.

Working in pairs

Tutors hand out photographs of celebrities, well-known people and sports men and women to each person in the group. They are not allowed to tell anyone who their picture is of.

Tutors then put the group in pairs, outside of friendship groups if possible. Then taking turns, one person asks questions about their partner's picture and their partner can only answer 'yes' or 'no'. They are given a time limit to find out the identity of their partner's celebrity.

Once the activity has finished, the tutor asks the group to reflect on how easy it was to communicate with someone when you only get yes or no answers. The group then reflects on how you have to phrase your questions to get the most information and also how to do this quickly under a time limit.

The activity could be repeated in different pairs.

Suggested time: about 1 hour.

Working with a group on an activity

The workshop can focus on building effective teams. There are a range of appropriate activities that learners can participate in.

For example, learners:

- work in small groups to build a tower that can support a marble. They are given drinking straws, sticky tape and a marble. The team that creates the highest tower wins
- work together to create a structure from balloons that will take the weight of one person in the group.

This type of workshop is ideal for discussing roles and responsibilities, participation, communication skills and problem solving.

Tutors could use a team-building activity at the beginning of each workshop instead of having a whole session focusing on this skill.

Suggested time: about 2 hours.

Communicating in teams

Working in groups, learners follow instructions to create an end product.

Learners will need to:

- check they understand what they need to do
- decide who is doing which task
- check progress and follow advice
- ask for help, if necessary
- respect each other's ideas and opinions
- solve problems.

At the end of this session, the group can discuss how effectively they communicated with each other, how well they worked together as a team, any issues they had and how they solved problems.

Suggested time: about 5 hours.

Relaying instructions to others

Learners can take part in a number of activities to develop effective communication skills. For example working in pairs, learners prepare instructions for a simple task such as tying shoe laces. They then share this with another group of learners who then follow the instructions. If the instructions are clear, learners should be able to tie their shoes successfully.

Suggested time: about 1 hour.

Debating a topic with others

Tutors give learners a number of topics to discuss in small groups with some key questions.

The group has to firstly decide on the topic they want to discuss and decide on an 'observer' to observe and take notes on the groups' interactions. The group will then be given five minutes to discuss the topic and come to some agreement on the answers to the questions.

The group will decide on one person to feed back on the answers to the questions. The observer will then feed back on how the group interacted with each other and came to decisions.

The activity can be repeated with different people taking the 'observer' role.

The whole group then discuss what they have learned in this session about the views of others and the different roles that are taken in a group.

Suggested time: about 2 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

You will work together (in pairs or larger groups) to put on a small fundraising activity at college for a charity day.

In your group you need to discuss and agree:

- the type of activity you will put on
- who you need permission from
- the date the activity will be on
- the resources needed to put on the activity.

You will agree the roles for each member of the group, ensuring that each of you has an equal amount of responsibility. You need to set up a log/blog explaining your role in the group and your key responsibilities. You need to keep this updated throughout the process.

Once the activity is completed your group will carry out a peer assessment of the activity, discussing how successful you were in working together to put on the activity, writing up the discussions in your log/blog and making suggestions for how you can improve your skills and behaviours.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

You will work with a different group of people to produce a stand for the college open day.

Unit A4: Researching a Topic

Level: **1**

Unit type: **Core**

Guided learning hours: **30**

Unit in brief

Learners will develop the skills needed to carry out some outline research into an agreed topic. They will keep a record of their investigation and then present a summary of their findings.

Unit introduction

In this unit, you will have the opportunity to research a topic that interests you. It could be linked to something you have enjoyed in your sector, something that is happening in your local community or perhaps linked to what you would like to do in the future.

Before starting on your research you will need to decide on the focus for your topic. You will set up a research log to record the research tasks you carry out and the sources that you use.

When you have completed your research, you will summarise and present your findings.

You will use many of the skills you have developed already, such as planning, time management, research and presenting, as well as any sector skills and knowledge that you have learned.

All these skills are important for progressing to further qualifications.

Learning aims

In this unit you will:

A Carry out research into an agreed topic

B Present a summary of research findings into an agreed topic.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Carry out research into an agreed topic	<ul style="list-style-type: none"> • Selecting a suitable topic • Collecting information on topic • Keeping a research log • Presenting findings of research 	<ul style="list-style-type: none"> • Research log. • A summary of research findings.
B Present a summary of research findings into an agreed topic		
Key teaching areas include:		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> • The research topic can be in a sector context. 	<ul style="list-style-type: none"> • Ways to plan successfully • Identifying sources of information • How to research • Presentation methods 	<ul style="list-style-type: none"> • Planning • Finding out • Managing information • Communication

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> • Present information/points of view clearly and in appropriate language. • Present information in a logical sequence. • Use correct grammar, including correct and consistent use of tense. • Ensure written work includes generally accurate punctuation and spelling, and that meaning is clear.

Unit content

Knowledge and sector skills

Selecting a suitable topic

- Investigation could focus on the local community or area, linked to a sector, hobby or an extra-curricular activity.
- Agreeing investigation title and the scope of the research with tutor.
- Agreeing deadline.
- Ensuring topic is focused and manageable in the timescales.
- Identifying key actions and milestones for the investigation such as setting up a log, organising visits, deadline for completion.

Collecting information on topic

- Sources of information:
 - electronic media, e.g. blogs, podcasts, downloads, websites
 - printed media, e.g. newspapers/magazines/books
 - interviews
 - visits.
- Identifying and selecting the key points from research.

Keeping a research log

- Ongoing record of information researched.
- Information on research sources, methods and key findings.
- Ongoing record of information found out through a chosen medium such as a folder, blog, vlog (video blog).

Presenting findings of research

- Summarising key findings.
- Choosing presentation method, e.g. through a PowerPoint®, vlog, written handouts, oral questioning.
- Explaining findings in a clear and concise way.

Transferable skills

- Planning: identifying key tasks to complete.
- Finding out: information from research sources.
- Managing information: selecting the relevant information, choosing appropriate sources of information.
- Communication: through presentation of findings.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Carry out research into an agreed topic		
A.P1 Search for information on an agreed topic using given research sources.	A.M1 Search for information on an agreed topic using own and given sources.	A.D1 Carry out a focused and detailed search into an agreed topic.
A.P2 Select simple information from given sources on the agreed topic.	A.M2 Select mostly relevant information from sources on the agreed topic.	A.D2 Select relevant information from sources that link clearly to the agreed topic.
Learning aim B: Present a summary of research findings into an agreed topic		
B.P3 Present an outline summary of research findings on an agreed topic.	B.M3 Present a clear summary of research findings on an agreed topic, with reference to some of the research sources used.	B.D3 Present a focused summary of research findings, with clear referencing to the research sources used.

Essential information for tutors

Units from Group A and Group B may assess the same transferable skills. Where this occurs, you may opt to deliver these units simultaneously. This is acceptable providing the delivery is planned appropriately and that all learning aims for both types of unit are met and covered in the assessment. You are not permitted to deliver a unit and then use learners' evidence from the unit to achieve another unit.

Essential information for assessment decisions

For distinction standard, learners:

- carry out research that remains focused on the agreed topic and uses a range of appropriate sources to collect information
- give a detailed breakdown of the sources they have used and select the most relevant information from them, demonstrating awareness of which sources were more reliable than others
- present their summary of research findings clearly, keeping the focus on the research topic. The summary will also reference in detail the research sources that were used.

For merit standard, learners:

- carry out research that remains mostly focused on the agreed topic but may become too broad in places. Some of the sources will have been given by tutors but some they have found for themselves
- outline the research sources used. They will select appropriate information for their topic. They will demonstrate some understanding of which sources are more reliable than others
- present their summary of research findings, remaining mostly focused on the agreed topic although may go off in other directions at some points. The summary will reference some of the research methods that were used.

For pass standard, learners:

- carry out basic research, using research sources that have been given by tutors
- produce a research log that gives incomplete information of the key tasks they have completed. They will select only simple and obvious information from the given sources
- present a basic summary of research findings that are mainly broad and unfocused. There will be little or no reference to the research methods used.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Choosing a topic to investigate

This is perhaps the hardest part of any project. Learners need to choose a topic that is interesting to them but not too big so that it becomes impossible to complete. In small groups, learners make a list of subjects or hobbies they are interested in. They can then ask each other questions about the topics or hobbies. This could begin to form a list of possible subjects for each project.

Alternatively, tutors could provide a list of potential topics for learners to choose from.

Suggested time: about 3 hours.

Deciding on outcomes

Learners can be given a list of outcomes and project titles. Their task will be to match the outcomes with the titles. They can then look at the results with other group members to see if they agree or have different answers. Tutors may want to include answers that will overlap with different topics.

Suggested time: about 3 hours.

Research sources

Tutors do a brief overview of what the difference is between a primary source and a secondary source. Tutors then give out a list of different research sources and learners work in pairs to decide whether it is primary or secondary. Learners feed back on their decisions.

Suggested time: about 2 hours.

Identifying the tasks that need to be completed

Learners plan a task list of the activities they need to complete. Tutors could produce a list of actions needed to complete a project in the wrong order and then, in groups, learners put them in the correct order. They will use the correct list to produce a to-do list of tasks to complete for their investigation.

Suggested time: about 3 hours.

Reviewing progress so far

As a group, learners will begin the session by reviewing what they have done so far. This should be a short presentation, depending on the number in the group. This activity is not intended to use the full time for the workshop. Learners can identify any problems they have had and how they have solved them, if they have. Other learners have the opportunity to ask questions about the project and share ideas.

Learners could record the review in their log.

Suggested time: about 3 hours.

What skills are you using?

This workshop will focus on the skills learners are using to carry out their project. Working in small groups, learners could identify different communication, planning, time-management and problem-solving skills. They can then share their results with the larger group.

Suggested time: about 3 hours.

How to present outcomes

Learners will investigate ways to present their research findings. They could experiment with vlogs or blogging software, and try out PowerPoint or Prezi.

They could also try using graphs, charts or illustrations to present information. Learners could work in small groups to decide which formats would be most appropriate for different topics.

Suggested time: about 3 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

You need to select a topic of your choice to carry out some research into. The topic could be an extension of something you have studied on your course or an interest or hobby that you would like to find out more about. You will discuss your ideas with your tutor and then come up with a title for your research. This should be focused and manageable in the time available to complete it. You will set up a research log to record what you are doing. This could be a folder, a blog or vlog. You will produce a to-do list of the tasks you need to complete in the timeframes given to you. While you carry out your research, you will keep an ongoing record of the sources and methods used to find out information. Finally you will summarise your key findings in a presentation method of your choice, making reference to the research sources you used.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

You will need to select a different topic for your research.

Unit ENG5: Manufacturing an Engineered Product Using Hand Tools

Level: **1**

Unit type: **Sector (Engineering)**

Guided learning hours: **40**

Unit in brief

Learners will develop practical skills when using hand tools to manufacture an engineered product, such as a toolbox or tool maker's clamp.

Unit introduction

Do you enjoy working with your hands and using tools to create useful products? Engineers are good at turning material, such as mild steel, into products that are more valuable, for example shaping and joining pieces of steel sheet to form the body panels of a car.

In this unit, you will learn how to manufacture an engineered product, for example by planning the job and carrying out activities such as rough sawing to size, filling flat and square edges and drilling and tapping a hole. You will learn how to read and interpret given engineering drawings and work out a plan before carrying out appropriate manufacturing activities. You will select the necessary tools and equipment needed for the job. You will develop skills in working safely, cleaning work areas when you have finished manufacture and returning tools and measuring equipment to safe storage.

The knowledge and skills developed in this unit will help you to progress to other qualifications in different sectors as well as to other engineering qualifications. The transferable and sector skills you develop in this unit can enable you to progress to further learning. They will also support you in completing the core skills units in Group A of the qualification.

Learning aims

In this unit you will:

- A** Manufacture an engineered product safely, using hand tools from a given drawing
- B** Review own performance in the manufacture of an engineered product.

Unit summary

Learning aim	Key teaching areas	Summary of required assessment evidence
A Manufacture an engineered product safely, using hand tools from a given drawing	<ul style="list-style-type: none"> • Relevant safe working practices • Planning for manufacture • Preparing for manufacture • Manufacturing activities • Review of activities carried out and the final product • Work area restoration 	Portfolio of evidence, including: <ul style="list-style-type: none"> • a finished product • photographic or video footage • complete inspection record • review of own performance • tutors' observation records.
B Review own performance in the manufacture of an engineered product		
Key teaching areas include:		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> • Safe working practices, work area preparation and restoration • Planning and preparing for manufacture • Hand tool skills to manufacture a product • Inspection checks during and after manufacture 	<ul style="list-style-type: none"> • Safe working practices • Reading information from and interpreting engineering drawings • Manufacturing a product using appropriate hand tools and inspection equipment • Know which tools are appropriate for different materials and product features 	<ul style="list-style-type: none"> • Managing information • Self-management

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> • Prepare for and contribute to the formal discussion of ideas and opinions. • Present information/points of view clearly and in appropriate language.
Mathematics	<ul style="list-style-type: none"> • Understand and use whole numbers and negative numbers in practical contexts. • Extract and interpret information from drawings, tables, diagrams, charts and graphs.

Unit content

Knowledge and sector skills

Relevant safe working practices

Safe working practices needed for the tasks to be carried out, including:

- managing own and others safety, including safe and correct use of tools and equipment, procedures to follow in case of accidents, e.g. cutting self
- personal protective equipment (PPE) – safety glasses, overalls, safety footwear, hair protection, barrier cream
- regulations and safety procedures
- good housekeeping practices, e.g. keeping the workshop clean and tidy
- what to do when things might go wrong, e.g. damaged materials and tool breakage.

Planning for manufacture

- Suitable engineered products, including drill drift, drill point angle gauge, drill stand, toolmaker's clamps, open tray, toolbox.
- Key features of a product and its constituent components, such as:
 - holes, e.g. through, blind, countersunk, threaded
 - shaping, e.g. 90° bend and folds
 - form, e.g. thickness, straight and curved edges and moving components
 - joining, e.g. rivets and self-tapping screws
 - standard symbols, e.g. surface finish, holes, threads, dimensions and tolerances, centre lines and sections.
- Materials, tools and other manufacturing equipment:
 - materials, e.g. mild steel, aluminium, plastic, wood, brass and copper
 - marking out tools, e.g. marking fluid, engineer's rule, scribe, scribing block, protractor, dividers, engineer's square, centre punch, oddleg callipers, vernier callipers
 - cutting tools, e.g. hacksaw, files, abrasive tape, tin snips, hand drill/hand-held power drill, centre drill, twist drill, reamer, die set, tap set tapping paste
 - lubricants, e.g. tapping paste, cutting fluid
 - shaping tools, e.g. hammers, pliers, tin snips
 - joining equipment, e.g. rivet guns, spanners, self-tapping screwdrivers, nuts and bolts
 - other equipment, e.g. vice jaws, clamps, fixtures, chucks, vernier callipers, micrometer.
- Manufacturing plan, including:
 - tools and equipment
 - quality checks
 - sequence of operations
 - supervisor approval.

Preparing for manufacture

Select and inspect tools, equipment and raw materials before manufacture.

- Raw materials:
 - correct type and size
 - free from damage or contamination, e.g. flaws, dirt, corrosion, excessive burrs.
- Cutting and shaping tools:
 - safe and usable condition, e.g. condition of saw blades, files and file handles, sharpness of cutting tools, hammer heads.
- Holding and securing equipment, including:
 - vice, clamps, fixtures, chucks.

Manufacturing activities

- Preparing materials for marking out: de-burring, datum faces and edges, application of marking fluid.
- Marking out: datums, centre lines, cutting guide lines, hole positions, profiles.
- Cutting and shaping, e.g. hand sawing, heavy and light cross filing, draw filing, drilling, tapping, bending.
- Profiles, e.g. radii, corners, bevels, angles, square edges.
- Hole positions, e.g. linear patterns, radial patterns.
- Correct use of hand tools.
- Quality checking:
 - visual inspection to identify problems, to include cuts, burrs, sharp edges, surface damage
 - accurate measurement of components and a finished product and understanding of tolerance
 - inspection record: whether measured dimensions are within tolerance limits and impact of poor accuracy on product functionality.

Work area restoration

- Swarf removal and recycling: brush, collection pan, storage for recycling.
- Tools and equipment: cleaning down, putting away, return to stores.
- Unused materials: condition check and return to stores.
- Work area inspection: visual checks, supervisor sign off.

Review of activities carried out and the final product

- Activities such as the order in which they were carried out, use of appropriate methods, tools and equipment, own working methods.
- Final product such as the success of the product, consideration of functionality, the final finish.

Transferable skills

- Managing information: determining the relevance of and how to interpret information required for manufacturing a product – the information could be from an engineering drawing(s) or other sources, e.g. manuals, risk assessment and health and safety documents.
- Self-management: monitoring performance during manufacture of a product, being flexible and proactive in solving problems, reviewing own strengths and areas for improvement during and after manufacture of a product.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Manufacture an engineered product safely, using hand tools from a given drawing		
A.P1 Produce an outline plan to manufacture a product, using information from given sources.	A.M1 Produce a detailed plan to manufacture a product, using information from different sources.	A.D1 Produce a detailed and coherent plan to manufacture a product, using information from different sources.
A.P2 Perform activities to manufacture a product safely, using hand tools.	A.M2 Perform activities appropriately to manufacture a product safely, using hand tools.	A.D2 Perform activities to manufacture a fully functional product safely, using hand tools accurately.
Learning aim B: Review own performance in the manufacture of an engineered product		
B.P3 Produce an outline review of own performance in the manufacture of an engineered product.	B.M3 Produce a detailed review of own performance in the manufacture of an engineered product, identifying the strengths and areas of improvement.	B.D3 Produce a detailed review of own performance when manufacturing a product, describing ways to improve future work.

Essential information for teachers

Essential information for assessment decisions

For distinction standard, learners:

- read and interpret given drawings and other information sources and produce a plan, with an appropriate amount of detail, of a sequence of manufacturing tasks, taking account of health and safety requirements. Learners have a technically effective discussion with the assessor when planning the manufacture of a product
- use relevant marking out, cutting and shaping tools, measuring equipment and, as required, joining methods to manufacture an accurate product that is of an appropriate quality (no appearance flaws or out of tolerance errors). If required, they carry out any rectification work to ensure accuracy and functionality of the product
- effectively manufacture a product. They work independently, safely and confidently, with no guidance from the assessor. They minimise the amount of raw material used and use cutting, shaping and joining tools appropriately and in an appropriate sequence
- complete a detailed review of the manufacture activity. This could be written or a verbal recording that gives a detailed overview of the activities they completed. They identify two or three areas where they need to improve, using examples from the activity.

For merit standard, learners:

- read and interpret given drawings to produce a plan that may lack appropriate detail in places, showing the steps in manufacturing and taking account of safe working practices. They hold productive discussions with the assessor when planning the manufacture of a product, while working independently with minimum guidance from the assessor
- use appropriate marking out, cutting and shaping tools, joining methods and measuring equipment to manufacture an accurate product. An accurate product will have acceptable quality, e.g. no appearance flaws and at most one out-of-tolerance error
- complete a review of the activities that covers most of the activities they completed. They identify one or two areas where they need to improve, giving some detail from the activity.

For pass standard, learners:

- produce an outline plan, following given drawings, showing some of the stages in manufacturing and taking account of safe working practices. The plan is likely to contain some errors or omissions, which may mean that a third party could not use it to manufacture the product. Learners' discussion with the assessor when planning the manufacture of a product may include some technically inaccurate information and/or important omissions
- work safely, taking account of health and safety rules with supervision and restoring the work area to a safe and tidy condition
- use some marking out, cutting and shaping tools, and joining methods and measuring equipment (as required) to manufacture a product. The product may have appearance flaws and some out-of-tolerance dimensional errors and they may not be fully functional
- may use cutting and shaping tools and joining methods that are not always the most appropriate. The sequence of operations and the amount of material used may not be effective, e.g. the amount of waste material may be excessive
- complete an outline review of their performance that gives some details on some of the activities they performed, with some outline references to the success of the product.

Essential resources

For this unit, learners will need access to:

- a mechanical engineering workshop equipped with hand tools and other equipment as specified in the unit content
- engineering drawings of the product to be manufactured
- raw materials available from a store
- appropriate personal protective equipment (PPE)
- photographic resources, e.g. tablet computer, camera or phone.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutors explain the importance of health and safety and how procedures are followed in the workshops. Learners investigate health and safety issues relating to given engineering workshop scenarios:

- identification of hazards and risks
- control measures
- personal safety
- safety of others.

Suggested time: about 3 hours.

Activity: Marking-out tools

Tutors demonstrate tools to be used for marking-out activities. Learners carry out basic marking-out activities:

- datums
- straight edges
- radii
- hole centres.

Suggested time: about 6 hours.

Activity: Cutting and finishing materials

Tutors explain and demonstrate the process of cutting and finishing material. Learners carry out basic cutting and metal removal activities:

- rough filing
- finish filing
- hand cutting straight edges
- hack sawing solid and hollow sections
- cutting and finishing curves
- cutting thin sheet using tin snips.

Suggested time: about 8 hours.

Activity: Drilling and tapping activities

Tutors demonstrate drilling and tapping activities. Learners carry out drilling and tapping activities:

- drilling single holes
- drilling arrays of holes
- tapping screw threads.

Suggested time: about 6 hours.

Activity: Shaping activities

Tutors demonstrate how to carry out shaping activities. Learners carry out basic shaping activities:

- 90 degree bends in thin sheet
- edge folding.

Suggested time: about 4 hours.

Activity: Assembling different products activity

Tutors demonstrate how to assemble different products. Learners carry out basic assembly activities:

- riveting thin sheets
- fixing using self-tapping screws
- fixing using nuts and bolts.

Suggested time: about 8 hours.

Activity: Manufacturing a product

Learners complete manufacturing activity – planning and manufacturing a product using different hand tools and carrying out quality checks for accuracy. Throughout the activity learners observe safety at all times and restore the work area to a safe and tidy condition.

Suggested time: about 5 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

You are starting work as an apprentice toolmaker and a team leader wants to find out how good you are working at a bench with hand tools. The team leader gives you drawings of a tool maker's clamp or a small rectangular open-topped toolbox. They ask you to manufacture the jaws of the clamp and the box by carrying out the following tasks.

- Look at the drawing, decide and record how you are going to make the clamp and box; confirm with the team leader how you will work safely and what tools and materials you will use to do the job.
- Prepare the work area in readiness for manufacture.
- Collect tools and materials from the store and check that they are fit for purpose.
- Prepare materials, e.g. cut to overall length.
- Mark out the components/product.
- Use hand tools and, as required, joining methods to manufacture the components/product, carrying out inspection checks as you go.
- Assemble the clamp and box; visually checking that they are as shown in the drawing and that the clamp works.
- Tidy up the workplace, put away tools and PPE and complete sign-off paperwork.
- Produce a review of own performance and the outcome of the final product.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

You are starting work as an apprentice for a small company that builds and installs ventilation ducting in factories. They have given you drawings of oddleg callipers and a tool rack to hold five flat files, which they would like you to manufacture.

Unit ENG6: Manufacturing a Component Using Machining Processes

Level: **1**

Unit type: **Sector (Engineering)**

Guided learning hours: **40**

Unit in brief

Learners will develop the practical skills required to manufacture a component, using manually operated workshop machinery, such as drills, lathes and milling machines safely.

Unit introduction

Whether or not you realised it at the time, at some point today you will have used something that was made using an engineering machine. Thousands of products, from motorbikes to food mixers, from buses to bridges, rely on these machines to shape many of their important components. Engineering machines are able to take a block, bar or rod of material, often a metal such as steel or brass, and cut it to the exact size and shape needed. This might involve drilling holes, turning down cylinders or milling out slots.

In this unit, you will carry out a range of processes using manually operated engineering workshop machinery. You will use a pillar drill and a centre lathe or milling machine to manufacture a simple product component, such as a screwdriver handle. You will develop the necessary skills to be able to do this safely and accurately. You will learn how to interpret an engineering drawing showing the required size and shape of the component that you will be making. You will then use appropriate machines and machining processes safely to make the component. Finally, you will perform quality inspection checks to compare the size and shape of your component with the drawing you were asked to work from.

The transferable and sector skills you develop in this unit can enable you to progress to further learning. They will also support you in completing the core skills units in Group A of the qualification.

Learning aims

In this unit you will:

- A** Carry out machining processes safely to manufacture a component
- B** Carry out inspection procedures and review own performance.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
<p>A Carry out machining processes safely to manufacture a component</p>	<ul style="list-style-type: none"> Using engineering drawings Safe working practices when using engineering machines Marking out processes Drilling processes Turning processes Milling processes Inspection, measurement and recording Review the machined component 	<ul style="list-style-type: none"> Annotated photographs taken at different stages of the component manufacturing process, supported by tutor observations. Component inspection records. A written report or recorded discussion about learner performance.
<p>B Carry out inspection procedures and review own performance</p>		
<p>Key teaching areas include:</p>		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> Interpreting engineering drawings Carrying out drilling safely Carrying out turning safely Carrying out milling safely Using specialist measuring equipment 	<ul style="list-style-type: none"> Understanding the features of engineering drawings Understanding the safe use of drilling, turning and milling processes and tools 	<ul style="list-style-type: none"> Managing information Reviewing manufactured component and own performance

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> Present information/points of view clearly and in an appropriate form.
Mathematics	<ul style="list-style-type: none"> Understand and use whole numbers and understand negative numbers in practical contexts. Add and subtract decimals up to two decimal places. Solve problems requiring calculation with common measures, including money, time, length, weight, capacity and temperature.

Unit content

Knowledge and sector skills

Using engineering drawings

- Key features of engineering drawings: orthographic projections, dimensions and tolerances.
- Common symbols and abbreviations, to include radius (r or RAD), diameter (\emptyset or DIA), chamfer (CHAM), countersink (CSK).
- Common line types: visible outline, hidden detail, centre lines and dimension lines.

Safe working practices when using engineering machines

- Important general safety considerations when working with engineering machines, to include the potential dangers of impact, trapping and entanglement, correct use of machine guarding, use of emergency stop procedures, machine isolation, use of personal protective equipment (PPE), keeping a clean and tidy work area, removing burrs or sharp edges from workpieces.
- Safe working practices relevant to drilling, turning and milling operations, to include handling tooling with sharp edges, dealing with tool breakages, swarf handling and disposal, lubricants.

Marking out processes

- To include use of engineer's blue, callipers, scribe, centre punch, steel rule.

Drilling processes

- Work holding, to include machine vice, vee blocks.
- Safe use of tools, to include twist drill, centre drill, countersinking tool.
- Machining features, to include through holes, blind holes, countersinks.

Turning processes

- Work holding, to include 3-jaw chuck.
- Safe use of tools, to include facing and turning tools, parting off tools, knurling tool, drilling, tailstock.
- Machining features, to include flat faces, parallel diameters, stepped diameters, chamfers, knurls, grooves, holes.

Milling processes

- Work holding, to include machine vice.
- Safe use of tools, to include face mills, end mills, slot drills.
- Machining features, to include flat faces, square faces, parallel faces, steps/shoulders, slots.

Inspection, measurement and recording

- Visual inspection to identify problems, to include false cuts, poor surface finish, burrs.
- Accurate measurement using appropriate equipment, to include steel rule, callipers, protractor, micrometer, height gauge, surface plate.
- Completion of inspection record forms to manage information: checklists and recording of tolerance limits.

Reviewing the machined component

- The causes of common problems with a machined component, to include avoiding false cuts, blunt tooling resulting in overheating, recognising set up and machining issues, removing too much material during a single pass.

Transferable skills

- Managing information: using engineering drawings, recording measurements, using checklists.
- Reviewing manufactured component and own performance: use of inspection and measurement to monitor accuracy, identifying areas requiring improvement, reflecting on performance and recommending improvements.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Carry out machining processes safely to manufacture a component		
A.P1 Carry out drilling and turning or milling processes to manufacture a machined component.	A.M1 Carry out drilling and turning or milling processes to manufacture a machined component with some efficiency, consistency and accuracy.	A.D1 Carry out drilling and turning or milling processes to manufacture a machined component with efficiency, consistency and accuracy.
Learning aim B: Carry out inspection procedures and review own performance		
B.P2 Carry out inspection procedures on a machined component.	B.M2 Carry out appropriate inspection procedures on a machined component.	B.D2 Carry out effective inspection procedures on a machined component.
B.P3 Identify a strength of your own performance.	B.M3 Identify a strength and a weakness of your own performance.	B.D3 Identify a strength and a weakness of your own performance, making a recommendation for improvement.

Essential information for tutors

Physical examples of the component to be manufactured and its associated engineering drawings should be made available for learners to inspect and compare.

Learners can be given assistance with interpreting engineering drawings.

Key dimensions for which tolerance limits are given should be identified on the component drawing. These will also form part of an inspection checklist for learners to fill in when carrying out inspection procedures.

General tolerances should be at least ± 0.5 mm; angular tolerances should be at least $\pm 2^\circ$.

Adequate training and supervision must be provided to ensure the safety of learners (and staff) in the delivery of this unit. Appropriate PPE must be worn at all times in the workshop.

During assessment activities, learners must demonstrate the safe and effective use of a pillar drill and either a lathe or a milling machine to complete a given component, which must include all the features shown on its engineering drawing.

The component should have at least one feature that can be produced on a pillar drill and two features that can be produced on a lathe/milling machine.

All workshop machinery must be manually operated (automated computer-aided design (CAD)/computer-aided manufacturing (CAM) workshop machinery is not suitable for use in this unit).

In order to assess how accurately the component has been machined by each learner, the assessor must carry out an independent inspection procedure on each component submitted for assessment.

Machines can be set up as ready to go but learners must carry out the machining operations.

Essential information for assessment decisions

For distinction standard, learners:

- carry out machining of the component efficiently and consistently, e.g. using power feeds on the machine for all similar machined features and making good use of rough and finish cuts when turning a diameter
- manufacture a completed component accurately, with all key dimensions within the specified tolerances stated on its engineering drawing and all features free from defects, e.g. by inspecting while in the process of machining
- carry out inspection measurements of all key dimensions and features accurately, and record them accurately on a given inspection checklist
- review their own performance by identifying a strength and weakness and recommending an improvement, e.g. strength might relate to a well-developed practical skill they were able to demonstrate and a weakness might relate to decisions with the appropriate use of measuring equipment, e.g. recognising the need to measure more often when parallel turning to ensure learners know when to reduce the material removed during each cut as they approach the final required diameter.

For merit standard, learners:

- carry out machining of the component with some efficiency and with some consistency, e.g. using power feeds on the machine for similar machined features and making some use of rough and finish cuts when turning a diameter
- manufacture a completed component with some accuracy, with most key dimensions within the specified tolerances stated on its engineering drawing and most features free from defects
- carry out inspection measurements of all key dimensions with some accuracy, and identify visual defects and record them with some accuracy on a given inspection checklist
- review their own performance by identifying a strength and weakness, e.g. strength might relate to a well-developed practical skill they were able to demonstrate and a weakness might relate to difficulties with the accurate use of measuring equipment.

For pass standard, learners:

- carry out machining of the component in an inefficient manner with a lack of consistency and/or an inappropriate number of cuts, e.g. not using power feeds on the machine and cutting manually using the handles and not making proper use of rough and finish cuts when turning a diameter
- manufacture a completed component with limited accuracy and some key dimensions within the specified tolerances stated on its engineering drawing and some features free from defects
- carry out inspection measurements of some key dimensions with limited accuracy, and identify some visual defects such as poor surface finish on faces and a burr around a drilled hole, and record them on a given inspection checklist
- review their own performance by identifying a basic strength of their own performance, e.g. by recognising that they wore the right PPE and used guards.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutors explain the different features that can be manufactured using different machining processes. Learners can then identify and name each feature on a range of sample components and suggest which machining processes and tools could have been used to create them.

The activity can be made more challenging by asking learners to suggest an alternative way of creating the same feature.

Suggested time: about 2 hours.

Activity: Engineering drawings and real components

Tutors explain the relationships between a selection of components (e.g. nuts, bolts or washers) and their associated engineering drawings. Learners can then match each component to its associated drawing.

The activity can be made more challenging by introducing left- and right-handed products (e.g. scissors) and using drawings with different scales (e.g. 1 : 2, 1 : 5).

Learners can then make a list of the other features of engineering drawings, such as tolerances, materials etc., which can then be used as the basis for a class discussion and further teaching.

Suggested time: about 3 hours.

Activity: Industrial visit – putting the unit into an industrial context

An industrial visit to a local company that uses machining processes to enhance learners' interest in the content of the unit.

It will help put the unit into a real-life industrial context and allow learners to ask questions regarding the technical skills involved in carrying out machining processes and the essential transferable skills valued by employers.

Suggested time: about 2 hours.

Activity: Practical demonstration – using a range of engineering machines

Tutors demonstrate the safe use of machines used to carry out machining processes.

This can be done using a mixture of live demonstrations and videos that can be accessed and studied by learners independently on demand.

Suggested time: about 3 hours.

Activity: Building practical skills – using a range of engineering machines

Following tutors' demonstrations, learners will need to develop their practical skills before the assessment activities. This will involve time in the workshop making a series of basic test pieces to demonstrate the features that will appear on the component that will be made during assessment.

Suggested time: about 14 hours.

Activity: Maintaining a learning diary or workshop logbook

Learners should maintain a diary or logbook in which to record what they have learned, new experiences and how their skills are developing or need to be developed. This does not need to be a conventional written account of their progress, and could include teaching notes, narrated video clips and photographs brought together in a slide presentation. This should be updated after every lesson.

Suggested time: about 4 hours.

Activity: Practical task – inspection and measurement

Tutors demonstrate the inspection and measurement of sample components similar to that which learners will be asked to make. These should be at various stages of completion, standard of finish and accuracy.

Learners can then use them to practise their visual inspection and measuring skills, including the completion of inspection record sheets for each component.

The activity can be made more challenging by asking learners to rate each component and put them in order from best to worst, before discussing the improvements needed in the worst examples.

Suggested time: about 4 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

During your first few weeks in the centre where you are training, your supervisor wants to assess your workshop skills. They give you the engineering drawings needed to produce a simple aluminium screwdriver handle and talk you through the processes used to make each feature and the tolerances that you will need to achieve. Your supervisor then asks you to make the screwdriver handle using turning and drilling operations safely and accurately to within the tolerances discussed. You are given six hours of workshop time in which to manufacture the handle, complete inspection records detailing the accuracy you have achieved and carry out a review of your own performance, suggesting areas that could be improved or developed further.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

After a few months, your supervisor wants to reassess your workshop skills. As before, you are given the engineering drawing for a component you will be required to make and your supervisor talks you through the processes used to make each feature and the tolerances that you will need to achieve. This time, the component is the shaped brass body of a plumb bob. You are given six hours of workshop time in which to manufacture this component, complete inspection records detailing the accuracy you have achieved and carry out a review of your own performance, suggesting areas that could be improved or developed further.

Unit ENG7: Using a Welding Process to Join Materials

Level: **1**

Unit type: **Sector (Engineering)**

Guided learning hours: **40**

Unit in brief

Learners will develop skills in joining metals safely using a welding process.

Unit introduction

From the latest sports cars to the highest buildings, welding is used to produce high-strength joints between pieces of metal. Welding is used in all sectors of engineering to join together the individual parts that, when combined, make complex working structures, for example motor vehicles.

Welding can be used to produce new structures, such as bridges, or to repair existing products, such as damaged cars.

In this unit, you will learn how to use one welding process to join together two pieces of metal. You will also learn how to plan, set up and operate the equipment needed to produce the weld. As welding can be dangerous, you will learn what the risk and hazards are and how to manage them to prevent accidents.

The transferable and sector skills you develop in this unit can enable you to progress to further learning. They will also support you in completing the core skills units in Group A of the qualification.

Learning aims

In this unit you will:

- A** Perform a welding process to complete different joints safely
- B** Record outcomes of visual checks and review own skills in welding.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Perform a welding process to complete different joints safely	<ul style="list-style-type: none"> • Preparing the work area and setting up welding equipment • Producing welded joints safely and demonstrating welding skills • Welding processes and equipment • Reviewing welded joints using visual checks • Reviewing own performance 	<ul style="list-style-type: none"> • Photographic/video evidence of welding and completed weld bead, supported by tutor observations. • A log or recorded discussion about learner performance.
B Record outcomes of visual checks and review own skills in welding		
Key teaching areas include:		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> • Planning skills • Welding tools and processes • Preparing an area for safe working • Setting up welding equipment • Setting up materials to be welded • Using personal protective equipment (PPE) • Performing welding 	<ul style="list-style-type: none"> • The hazards and risks associated with welding and how to manage them • The different settings of the welding equipment and the effects these have on the weld • Estimating measurements 	<ul style="list-style-type: none"> • Reviewing own performance when welding joint(s) • Self-management

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> • Read and understand texts, using information from the text. • Present information/points of view clearly and in an appropriate form.
Mathematics	<ul style="list-style-type: none"> • Add, subtract, multiply and divide whole numbers using a range of strategies.

Unit content

Knowledge and sector skills

Preparing the work area and setting up welding equipment

- Preparing the work area for welding, e.g. positioning welding screens and setting up fume extraction.
- Following systems in place for risk assessment, Control of Substances Hazardous to Health (COSHH) regulations 2002, PPE and other relevant safety regulations.
- Obtaining confirmation that the welding equipment is safe to use.
- Setting and adjusting the parameters as required, e.g. the welding current, and wire and gas feed rates for metal inert gas (MIG) equipment.
- Preparing the materials and the joint in readiness for welding, e.g. cleaning the joint faces, setting up the joint and supporting the joint.
- Good housekeeping, e.g. making sure that the work area is maintained and left in a safe and tidy condition.

Producing welded joints safely and demonstrating welding skills

- Following safe working practices when producing welded joints.
- Ensuring that the control measures are used effectively to minimise the hazards and risks associated with the welding process for self and for others.
- Completing a welded joint with the following characteristics:
 - consistency – the weld bead is smooth, uniform and of appropriate size for the materials being joined
 - serviceability – the weld bead is adequately fused to the parent metal such that it would not break under normal operating conditions and the parent metal is free from damage caused by the welding process.

Welding processes and equipment

- Main types of welding process, to include at least one from gas, MIG, manual metal arc (MMA).
- Equipment associated with one of the three welding processes, e.g. oxygen and acetylene cylinders, torch, regulator, pipe work and nozzle for gas welding.
- Main types of welded joint to include lap and butt joints, and how to position materials to be joined in this way.
- Main functions of the components of a welding system, e.g. the earth return cable completes the circuit from the welding rod back to the welding machine.

Reviewing welded joints using visual checks

- Welding joint that meets the operational requirements.
- Weld bead of even width and profile.
- Parent material free from damage.
- Weld bead with sufficient penetration.
- Identifying improvements to the practical method that could improve the quality of the joint.

Reviewing own performance

- Selecting and using appropriate welding equipment and materials.
- Selecting and using appropriate safety equipment.
- Using appropriate techniques to produce a welded joint.
- Making recommendations for improvements based on visual checks and outcomes.

Transferable skills

- Reviewing own performance when welding joints: identifying own strengths in performing a welding task, making improvements to processes and to own performance.
- Self-management: production of a welded joint that has to take place in a single continuous pass, good housekeeping, e.g. making sure that the work area is maintained and left in a safe and tidy condition.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Perform a welding process to complete different joints safely		
A.P1 Produce one serviceable lap joint and one serviceable butt joint.	A.M1 Produce one serviceable lap joint and one serviceable butt joint with continuous welds, showing some consistency and uniformity.	A.D1 Produce one serviceable lap joint and one serviceable butt joint with continuous welds, showing good consistency and uniformity.
Learning aim B: Record outcomes of visual checks and review own skills in welding		
B.P2 Record outcomes of visual checks and identify a strength of your own welding skills.	B.M2 Record outcomes of visual checks and describe a strength of your own welding skills, making a recommendation for further welding skill development.	B.D2 Record outcomes of visual checks, explain a strength of your own welding skills and make a recommendation for further welding skill development.

Essential information for tutors

It is necessary for learners to have the welding area, equipment and materials prepared for them in advance, however learners must carry out the welding processes themselves. Learners can use one or two types of welding process to produce one lap and one butt joint. Weld beads should be at least 50 mm long. While examples are provided below of how photographs of welds are to be used as part of the welding skills review, learners should also be encouraged to comment on their adherence to safe working practices.

Essential information for assessment decisions

For distinction standard, learners:

- produce one lap and one butt joint where each weld has only minor defects, e.g. the width of one or both of the weld beads increases slightly along its length. The welds will have characteristics that indicate they would have sufficient strength to keep the parent materials together, in normal operating conditions, for the materials being joined
- produce photographs that show, in detail, a section of their welded joints, e.g. three photographs show a 50 mm section of the lap joint weld from above, the side and from behind. The photographs will be annotated to explain a feature that demonstrates a strength of their own welding skills, e.g. that the weld has sections with an even profile means the welding torch was moved at a steady rate
- provide a recommendation for further welding skill development, e.g. that they should find out why the centre of the weld bead is not at the same distance from the edge of the metal at the end of the weld as it was at the start of the weld.

For merit standard, learners:

- produce one lap and one butt joint where the welds are mostly free from defects, e.g. the profile of one or both of the weld beads is slightly inconsistent. The welds will have characteristics that indicate they would have sufficient strength to keep the parent materials together, in normal operating conditions, for the materials being joined
- produce photographs that show, in detail, a section of their welded joints, e.g. three photographs show a 50 mm section of the lap joint weld from above, the side and from behind. The photographs will be annotated to describe a feature that demonstrates a strength of their own welding skills, e.g. that the weld has sections with good penetration which means that the weld has joined the whole thickness of the parent metal
- provide a recommendation for further welding skill development, e.g. that they should find out how the settings of the welding machine can be adjusted to reduce defects in the welded joint.

For pass standard, learners:

- produce one lap and one butt joint where the welds are free from significant defects, e.g. holes burnt through the parent metal. The welds will have characteristics that indicate they may have sufficient strength to keep the parent materials together, in normal operating conditions, for the materials being joined
- produce photographs that show, in detail, a section of their welded joints, e.g. three photographs show a 50 mm section of the lap joint weld from above, the side and from behind. The photographs will be annotated to identify a feature that demonstrates a strength of their own welding skills, e.g. that the weld has sections with good penetration.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutors introduce learners to the use of welds in different sectors, e.g. car manufacture, civil engineering.

Tutors show learners around the workshop and learners observe key health and safety features. Learners then take part in a tutor-led discussion to review safe working practices.

Learners watch videos of oxy-acetylene, MIG and MMA welding processes being performed.

Videos are used to introduce the processes as these eliminate the need for learners to use PPE.

Learners and tutors discuss suitable clothing that will allow safe participation in welding activities. This is then extended to expected behaviours. Learners should be made aware of the importance of being dressed appropriately if they are to participate in practical activities.

Suggested time: about 1 hour.

Activity: Preparing the work area and using PPE

Tutors deliberately organise areas where welding will take place with a range of potential hazards, e.g. obstructions on the floor or the presence of flammable materials. Working in pairs, learners inspect the work areas and note these hazards.

Tutors prepare an area for safe welding by removing examples of all the hazards that learners have observed. Tutors instruct learners on how to remove these hazards and then supervise learners as they make the work area safe.

Tutors then demonstrate the safe use of PPE. Learners are issued with PPE appropriate to the welding process being performed and put it on correctly.

Tutors introduce learners to the welding equipment they will be using. This should include the names and functions of the key components, safety considerations, and how to correctly start up and shut down the equipment.

Having established a safe working area and having provided protection for learners, tutors demonstrate the welding process that learners will be using. Learners observe and note the hazards produced during the welding process.

Suggested time: about 2 hours.

Activity: Producing a weld bead

Tutors review safe working practices and ensure that learners are aware of the risks associated with the welding process and how to manage them. Tutors again review the equipment to be used, testing learners' knowledge from the previous session. Learners are shown, step by step, how to correctly set up the equipment.

Tutors demonstrate the key requirements of depositing a weld bead on a single piece of metal.

Learners are given material of appropriate thickness on which to deposit a weld bead. Using previously set-up equipment in a safe working area, tutors supervise learners working in pairs using the welding equipment. In each pair, one learner uses the welding equipment while the other observes and ensures that safe working practices are observed. After an appropriate period of time, learners swap roles within each pair and repeat the process. During this practical activity, tutors ensure the safety of learners and provide guidance on the welding process.

At the end of the welding practice session, tutors demonstrate the methods used to dispose of the practice welds and associated waste and to return the work area to its original state ready for the next user.

Learners then follow these instructions to tidy up their work area.

Suggested time: about 3 hours.

Activity: Setting up welding safety equipment

Tutors review personal safe working practices and ensure that learners are aware of the risks associated with the welding process and how to manage them. Tutors review the key requirements of depositing a weld bead.

Tutors demonstrate the use of safety equipment to protect people in the area where welding is taking place, e.g. the use of screens and fume extraction.

Tutors then demonstrate the effects of altering the settings of the welding equipment, e.g. altering the current and wire feed speed of an MIG welder.

Learners then deploy the safety equipment to ensure the safety of others. They practise the deposition of a weld bead as previously. Learners experiment with the settings of the welding equipment, within safe limits, to become familiar with the effects of changing them.

At this stage, tutors should determine if learners can demonstrate sufficient ability in producing the weld bead, based on the visual criteria introduced above, to progress to joining two pieces of metal. Where some learners require more practice, this should be facilitated.

Suggested time: about 2 hours.

Activity: Joining two pieces of metal

Tutors demonstrate how to tack two pieces of metal together to allow either a butt or lap joint to be produced. Tutors then demonstrate depositing a weld bead to join the pieces together. Tutors review the key requirements for positioning and tacking the two pieces.

Learners then apply tacks of appropriate size and spacing to hold the materials being joined together. Tutors check them to ensure suitability before learners deposit a weld bead to join the materials. Learners repeat the process until such time as they can successfully tack and deposit a weld bead that is at least 50 mm long to join the materials together.

Suggested time: about 3 hours.

Activity: Inspecting welded beads

Tutors introduce the visual criteria by which a weld bead should be judged in terms of quality. Using prepared specimens, tutors show learners weld beads that have an even width, a consistent profile and that have not damaged the parent material. These are then compared to weld beads that do not demonstrate these qualities. Learners are directed towards the quality of weld bead that they should be producing. Tutors then describe potential reasons for welds not meeting expected standards, e.g. welding current too high, resulting in undercuts, and explains solutions to these problems.

Suggested time: about 1 hour.

Activity: Joining two pieces of metal with a different joint

As learners demonstrate competence in joining two pieces of metal using the same joint, they then progress to joining metals using another type of joint. Depending on the process being used, this may mean that learners move from a butt to a lap joint, or vice versa, gaining proficiency in both butt and lap joints.

The process of learners acquiring the skills required to complete this new joint is repeated. The level of support offered is gradually reduced as learners' skills increase.

During these activities, learners compare their outputs to the expected visual standards.

Suggested time: about 3 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

The centre where you are training is having an open day. Your supervisor wants to demonstrate how 'hands-on' the course is and how learners are taught to weld. Your supervisor has prepared a welding bay for you, with curtains that will allow visitors to watch you welding safely. You will be asked to produce butt and lap joints that demonstrate your welding skills, along with a log that records your visual checks and a suggested area for improvement.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

You are part of a team at your centre that is working on a project to manufacture an engineered assembly that will be welded together. As the welding will be an important part of the project, your tutor has decided to allocate you and your classmates the welding task to produce lap and butt welds. In order to demonstrate your skill, you are required to produce specimen test welds for your tutor to inspect. You must complete a log recording your visual checks and a suggested area for improvement.

Unit ENG8: Assembling Electronic Circuits

Level: **1**

Unit type: **Sector (Engineering)**

Guided learning hours: **40**

Unit in brief

Learners will develop skills in assembling electronic circuits.

Unit introduction

On their own, electronic components are simple objects that can perform only a very limited range of tasks. However, when these simple components are joined together, they combine to produce circuits that can carry out useful tasks. These circuits are the building blocks that enable mobile phones, computers and the internet, as well as all other electronic equipment, to function correctly.

In this unit, you will learn how to join a range of electronic components together to make circuits that perform a range of functions. You will learn how to use information to correctly identify components and connect them in the correct positions. You will use a range of circuit assembly techniques, including breadboards that allow ideas to be quickly tested and printed circuit boards (PCBs) used in products you can buy. All of these tasks will need to be performed in a safe way. The transferable and sector skills you develop in this unit can enable you to progress to further learning. They will also support you in completing the core skills units in Group A of the qualification.

Learning aims

In this unit you will:

- A** Use information to assemble a breadboard circuit
- B** Use information to assemble a PCB.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Use information to assemble a breadboard circuit	<ul style="list-style-type: none"> • Safe working practices • Electronic circuits • Assembling electronic circuits using a range of components • Tools and equipment and assembly processes 	<ul style="list-style-type: none"> • Photographic/video evidence of the working electronic circuits, supported by tutor observations. • Written records confirming that the circuits perform as expected.
B Use information to assemble a PCB		
Key teaching areas include:		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> • Using information, tools and equipment to assemble electronic circuits • Using breadboard and ready-made PCBs to assemble an electronic circuit 	<ul style="list-style-type: none"> • Awareness of the hazards and risks associated with the assembly of an electronic circuit • Ability to identify and select electronic components from pictorial information and physical models 	<ul style="list-style-type: none"> • Managing information • Problem solving

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> • Read and understand texts, using information from the text. • Present information/points of view clearly and in an appropriate form.
Mathematics	<ul style="list-style-type: none"> • Add, subtract, multiply and divide whole numbers using a range of strategies. • Extract and interpret information from tables, diagrams, charts and graphs.

Unit content

Knowledge and sector skills

Safe working practices

Learners should be taught to follow safe working practices, to include:

- personal protection, e.g. wearing protective clothing, removal of loose clothing and jewellery, eye protection, safety footwear
- preparation of assembly area
- good housekeeping, e.g. cleanliness of work area, removal of waste materials
- the storage of materials/components, tools and equipment
- maintenance of access, e.g. clear walkways, emergency exits
- avoiding burns caused by hot equipment and components
- avoiding fumes caused by the soldering process
- avoiding the risks posed by lead-based solders
- inspecting soldering equipment for damaged/burnt insulation.

Electronic circuits

Learners should be taught to assemble electronic circuits with similar levels of complexity to the circuits listed below.

- A transistor flip-flop circuit to flash two light-emitting diodes (LEDs).
- A resistor, capacitor and transistor time delay circuit.
- A 555 astable circuit to generate an audio tone on a loudspeaker.
- A 741 operational amplifier light-sensitive circuit.

Assembling electronic circuits using a range of components

Learners should be taught to assemble electronic circuits with devices/components, to include:

- power sources, e.g. batteries, power supplies
- switches, e.g. push-to-make, toggle
- resistors, e.g. fixed, variable, light or heat dependent
- capacitors, e.g. fixed, variable, electrolytic
- diodes, e.g. LEDs
- semiconductor devices, e.g. transistors.
- integrated circuits, e.g. 555 timer, 741 operational amplifier
- electromechanical devices, e.g. motors, loudspeakers.

Tools, equipment and assembly processes

- Tools and equipment, to include:
 - hand tools, e.g. pliers, wire strippers, side or end cutters, screwdrivers
 - bench tools, e.g. power sources, soldering irons and stands, PCB drills.
- Assembly processes, to include:
 - breadboard
 - ready-made PCBs.

Transferable skills

- Managing information: using a resistor colour code table to determine numerical values from resistor colours and vice versa; identifying components by their visual appearance using images obtained from information sources such as data sheets and manufacturer/retailer catalogues, using both printed and online sources of information; identifying and using appropriate connections for electronic components obtained from printed data sheets or catalogues.
- Problem solving: following systematic sequences of assembly, e.g. from a diagram or physical example.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Use information to assemble a breadboard circuit		
A.P1 Use pictorial information to assemble a breadboard circuit that operates as intended.	A.M1 Use pictorial information to assemble a breadboard circuit that operates as intended and with components placed in logical positions.	A.D1 Use pictorial information to assemble a breadboard circuit that operates as intended, with components placed in logical positions and connections neatly arranged.
Learning aim B: Use information to assemble a PCB		
B.P2 Use information from a physical model to assemble a PCB that operates as intended.	B.M2 Use information from a physical model to assemble a PCB that operates as intended and with the components accurately inserted.	B.D2 Use information from a physical model to assemble a PCB that operates as intended, with the components accurately inserted and with high-quality soldering.

Essential information for tutors

Essential information for assessment decisions

Learners are expected to assemble circuits that operate as intended, for example that the 555 timer functions correctly. Testing of circuits using multimeters and other testing devices is not required but can be used with tutor assistance if appropriate and helpful.

For distinction standard, learners:

- demonstrate that they can use information from pictures/images to select the components needed to assemble a breadboard circuit. During assembly, components will be inserted into the breadboard such that the required connections can be made and their placement is efficient, e.g. components that are joined together being placed near each other and orientated such that some connections are made directly on the breadboard with no extra wires needed. There will be no unnecessary connections. The wires used to make connections between components will be correctly inserted, neatly routed and will have an appropriate amount of insulation removed. The circuit will function as expected
- demonstrate that they can use information from an example of a physical circuit to select the components needed to assemble a PCB. During assembly, component legs will be inserted into the correct positions, the bodies of the components will be positioned in the most appropriate manner, e.g. flush with the component side of the PCB, and the excess on the component legs will be snipped off. Joints on the PCB will be soldered to make secure electrical connections as required, will work consistently and the majority will have a tidy appearance, e.g. a 'volcano' shape. The circuit will function as intended.

For merit standard, learners:

- demonstrate that they can use information from pictures/images to select the components needed to assemble a breadboard circuit. During assembly, components will be inserted into the breadboard such that the required connections can be made and their placement is efficient, e.g. components that are joined together being placed near each other and orientated such that some connections are made directly on the breadboard with no extra wires needed. There will be no unnecessary connections. Wires used to make connections will be correctly inserted, and most will not be excessively long or have too much, or too little, insulation removed. The circuit will function as expected
- demonstrate that they can use information from an example of a physical circuit to select the components needed to assemble a PCB. During assembly, component legs will be inserted into the correct positions, and the bodies of most components will be positioned in the most appropriate manner, e.g. flush with the component side of the PCB. Joints on the PCB will be soldered to make the electrical connections required but may have an untidy appearance. The circuit will function as intended.

For pass standard, learners:

- demonstrate that they can use information from pictures/images to select the components needed to assemble a breadboard circuit. During assembly, components will be inserted into the breadboard such that the required connections can be made but their placement may not be efficient, e.g. components that are joined together being placed in opposite corners of the board. There may be some unnecessary connections. Wires used to make interconnections will be correctly inserted but may be excessively long or have too much, or too little, insulation removed. The circuit will function as expected
- demonstrate that they can use information from an example of a physical circuit to select the components needed to assemble a PCB. During assembly, legs of the components will be inserted into the correct positions but the body of the component may not be positioned in the most appropriate manner, e.g. excessive lengths of component leg protruding on the component side of the PCB. Joints on the PCB will be soldered to make the electrical connections required but may be insecure in places or have an untidy appearance. The circuit will function as intended most of the time, e.g. it may work intermittently.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Learners are given a breadboard and the components required to assemble a simple, low-voltage DC circuit, such as a resistor capacitor time delay to turn on an LED.

Tutors explain and demonstrate how the breadboard is used to connect components.

They describe the reasons for using a breadboard to model prototype circuits.

Tutors then demonstrate the step-by-step method of assembling the chosen circuit. During this demonstration, tutors should point out common errors that should be avoided, such as failing to insert connections into the same row, or inserting components in the wrong orientation.

Learners reproduce each step until all the components are connected. Tutors should then undertake a visual examination of the circuit.

During this session, tutors should ensure that health and safety practices are observed, but potential risks should be avoided as far as possible to enable learners to assemble a working circuit in the first taught session.

Suggested time: about 2 hours.

Activity: Safe working practices

Tutors demonstrate how to safely prepare a work area for electronic assembly tasks and the safe working practices required to work with tools and equipment.

Learners ensure that their working area is free from hazards, e.g. ensuring that the work bench and floor area are clean and tidy, and that the tools and equipment to be used are in good condition.

Tutors then demonstrate the risks and hazards associated with soldering and ways of managing them, such as ventilation, the use of soldering iron stands, avoiding contact with hot tools or components and avoiding contact with lead-based solder and chemicals.

Tutors then observe learners preparing their work area for electronic assembly processes, providing feedback and guidance where required.

Suggested time: about 1 hour.

Activity: Soldering safely

Tutors introduce the soldering process and demonstrate how to solder components onto a stripboard. There is no need to solder the components to form a working circuit; the focus should instead be on demonstrating the methods required to produce a joint of appropriate quality.

Tutors should make learners aware of the need to avoid using too much solder resulting in tracks short-circuiting, or too little resulting in dry joints being produced.

Tutors ensure that learners are aware of, and can comply with, the safety requirements of using soldering equipment.

Suggested time: about 1 hour.

Activity: Identification of common components

Tutors explain the use of resistor colour codes and how lookup tables or software programs can be used to determine numerical values from colours and vice versa. Learners are given resistors with a range of different values and use the information provided to determine the values of these resistors. They then determine the appropriate colour codes for given numerical values. Using these skills, learners then select the resistors required for a circuit from the available range.

Tutors show learners the visual appearances of a range of common electronic components, such as switches, capacitors, transistors and LEDs. The outcome of this should be that learners are able to select the appropriate components required to assemble an electronic circuit.

Suggested time: about 2 hours.

Activity: Assembly of a PCB

Learners combine the soldering and component recognition skills they have already developed in order to assemble a functional PCB.

Learners should be given a prepared PCB, with a completed version of the assemble circuit to copy. The circuit should contain a range of simple components, such as resistors, capacitors, transistors and LEDs. Learners should also be given the components required to assemble the circuit. These components should have no additional means of identification other than those provided by the original manufacturer.

Tutors demonstrate how to determine the correct components to be inserted in the PCB, as well as how to insert the components into the board such that they are ready to be soldered in place.

Learners follow a step-by-step method to identify where each component should be placed in the PCB before being soldered permanently to the board. Tutors then check the correct placement of the components before learners complete the soldering process. Tutors should determine the frequency of checking dependent on the capability of learners. For example, where learners have demonstrated proficiency in identifying the components, they could be allowed to add all the components before the board is checked. Where learners are less proficient, checking could be completed after each group of components is added, e.g. all the resistors, or after each individual component if needed. Having placed the components onto the PCB, learners should then solder them into place.

As with inserting the components, the level of supervision exerted by tutors should be dependent on the observed proficiency of learners. Tutors should ensure that safe working practices are followed at all times.

Once the PCB has been checked visually, the circuit should have power applied to confirm appropriate performance.

Suggested time: about 3 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

You are a second-year learner at a local training centre. The centre is preparing for an open evening to recruit next year's students.

You have been asked to produce several circuits that will be displayed to prospective new students to show them the types of skills and experiences they could gain if they joined your course.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity:

You will soon be looking for either employment or progression to a higher-level training course. Your tutor has suggested that you will find it useful to take to interviews a portfolio that shows the skills you already have developed. They have also suggested that you should provide evidence of the electronic assembly processes you have completed as these are skills in high demand.

Unit ENG9: Carrying Out Routine Mechanical Servicing of Equipment

Level: **1**

Unit type: **Sector (Engineering)**

Guided learning hours: **40**

Unit in brief

Learners will develop skills in carrying out routine mechanical servicing of equipment and self-management skills.

Unit introduction

Have you ever had to replace the brake pads on a bicycle because they were worn down, or perhaps just cleaned your bicycle and oiled the chain? Obtaining the correct parts, tools and materials to do the job safely is important for improving reliability and preventing breakdowns. After all, a bicycle with poor brakes or with a rusty chain could be difficult or even dangerous to ride. You would want to know it was safe before taking it out onto the road.

In this unit you will carry out routine mechanical servicing on equipment, for example a centre lathe in an engineering workshop. You will follow a service plan to enable you to carry out the service in the proper sequence using appropriate tools, equipment and materials safely. You will return the equipment to good working order and at all times follow 'good housekeeping' rules.

The transferable and sector skills you develop in this unit can enable you to progress to further learning. They will also support you in completing the core skills units in Group A of the qualification.

Learning aims

In this unit you will:

- A** Carry out a routine mechanical service on equipment safely
- B** Demonstrate self-management skills.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Carry out a routine mechanical service on equipment safely	<ul style="list-style-type: none"> Routine mechanical servicing of equipment Following a service plan 	<ul style="list-style-type: none"> Tutor observations. Service record. A written report or recorded discussion about learner performance.
B Demonstrate self-management skills		
Key teaching areas include:		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> Following a service plan for routine mechanical servicing of equipment Practical skills and procedures for routine mechanical servicing of equipment Workplace housekeeping skills Health and safety 	<ul style="list-style-type: none"> Types of equipment requiring routine mechanical servicing Reasons for routine mechanical servicing Tools, equipment, materials, parts and components used for routine mechanical servicing Safe working practices, including good housekeeping Use of service plans 	<ul style="list-style-type: none"> Managing information Self-management

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> Utilise information contained in texts. Write clearly and coherently, including an appropriate level of detail. Use language, format and structure suitable for purpose and audience.
Mathematics	<ul style="list-style-type: none"> Extract and interpret information from tables, diagrams, charts and graphs. Solve problems requiring calculation with common measures, including money, time, weight, capacity and temperature.

Unit content

Knowledge and sector skills

Routine mechanical servicing of equipment

- Reasons for carrying out a routine mechanical service, e.g. to improve reliability, to improve safety, to avoid breakdown, to comply with manufacturer's warranty.
- Types of equipment, e.g. bench drill, centre lathe, pump, motor, gearbox.
- Types of routine mechanical service, e.g. cleaning, lubrication check, topping up oil and cutting fluid levels, visual checks on drive belts, setting belt tensions, replacing worn or broken parts, cleaning filters, bearing replacement.
- Safe working practices and procedures, to include permit to work notice, equipment preparation, isolation and lock-out, personal protective equipment (PPE), safe disposal of waste and hazardous materials and substances.
- Correct use of service tools and equipment, replacement parts and components, resources and materials.

Following a service plan

- Sequence of operations, e.g. disassemble, clean or replace, reassemble.
- Service tools and equipment, e.g. spanners, screwdrivers, torque wrench, oil can, grease gun.
- PPE, e.g. overalls, gloves, eye protection.
- Replacement parts, e.g. drive belt, filter, gasket, bulbs.
- Resources and materials, e.g. wire wool, sealant, degreasing agent, cleaning materials, cloths.
- Recommended timescales and returning the equipment to good working order.
- Service records.

Transferable skills

- Managing information: using technical information during preparation and servicing, e.g. correct type of lubricant, replacement part numbers, torque settings.
- Self-management: housekeeping, e.g. time management, checking equipment, organisation of work area, use and placement of tools and equipment, management of liquids and hazardous materials, cleanliness during and after the process, transportation of tools, equipment and parts, lifting and handling, safety awareness, recognising issues.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Carry out a routine mechanical service on equipment safely		
A.P1 Carry out a routine mechanical service on equipment and complete a basic service record.	A.M1 Carry out a routine mechanical service on equipment on time, with some accuracy, and complete a service record.	A.D1 Carry out a routine mechanical service on equipment on time, accurately, and complete a comprehensive service record.
Learning aim B: Demonstrate self-management skills		
B.P2 Demonstrate limited housekeeping skills when carrying out a routine mechanical service.	B.M2 Demonstrate a range of housekeeping skills when carrying out a routine mechanical service.	B.D2 Demonstrate a comprehensive range of housekeeping skills when carrying out a routine mechanical service.

Essential information for tutors

Learners will be given a service plan for a routine mechanical service on a piece of workshop equipment or other appropriate equipment. The plan should have sufficient detail to enable them to carry out well-defined routine mechanical servicing tasks in the prescribed manner, within the specified time and to the standard of accuracy required.

Each learner should have adequate room to work safely and have access to all the tools, equipment, materials, parts and components required for the service, including PPE. Adequate supervision should be provided during practical activities. It would be beneficial for learners to either demonstrate or observe the equipment working correctly after it has been returned to service; tutors should decide which is most appropriate.

The assessment activity gives learners the opportunity to demonstrate their self-management skills in taking responsibility for the organisation and practical completion of the service safely.

Work areas should be prepared for learners with the correct tools, equipment, resources, materials, parts and PPE provided.

Essential information for assessment decisions

For distinction standard, learners:

- carry out a routine mechanical service on equipment that follows a given plan accurately and returns the equipment to service within the prescribed timescale
- complete a comprehensive service record to confirm completion of the mechanical servicing, e.g. including the reasons for and details about component cleaning, replacement, repair or renewal such as condition/wear, part numbers, recording the quantities, types and part numbers of replacement components used
- demonstrate a comprehensive range of housekeeping skills during and after the mechanical servicing, e.g. returning tools and equipment in good condition, flagging equipment that needs repair, disposing or recycling of waste, hazardous materials and substances.

For merit standard, learners:

- carry out a routine mechanical service on equipment that follows a given plan with some accuracy and within the prescribed timescale
- complete a service record to confirm completion of the mechanical servicing, e.g. including the recording of decisions taken about component cleaning, replacement, repair or renewal
- demonstrate a range of housekeeping skills during and after the mechanical servicing, e.g. the disposal of waste, hazardous materials and substances and worn parts.

For pass standard, learners:

- carry out a routine mechanical service on equipment but do not follow a given plan accurately or do not finish within the prescribed timescale
- complete a basic service record to confirm completion of the mechanical servicing, e.g. indicating date and time of completion and returning to service, with limited detail about component cleaning, replacement, repair or renewal
- demonstrate limited housekeeping skills during and after the mechanical servicing, e.g. returning tools and equipment.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Demonstration

Using a poorly-maintained bicycle, tutors ask learners what they think needs attending to before it can be made roadworthy. Tutors make a list of the items that need attending to and have some replacement parts, cleaning materials, tools and equipment at hand. Ask for volunteers to perform simple tasks, e.g. changing the brake pads, tensioning the gear-change cable, allowing learners to have a go.

Learners need only perform two or three simple tasks to begin to understand the need for routine servicing. Through discussion, explore the likely results of failing to service equipment routinely and introduce briefly the idea of a service plan, i.e. listing the steps needed to perform one of these tasks.

Through a question and answer session, tutors establish the need for routine mechanical servicing, some form of plan, the correct tools and equipment, and having the right replacement parts ready. Learners develop their understanding of the likely outcomes of not servicing equipment routinely.

Workshop equipment

On a worksheet showing photos of items of workshop equipment, learners identify the equipment in the workshop that they can see or that has been put out for them. Through group discussion, suggest ways in which various items of equipment might require routine mechanical servicing.

Tutors should relate the servicing of workshop equipment to everyday servicing and the repair of items that learners are familiar with, such as the bicycle they have just seen or a car. This is an opportunity to briefly explore the reasons for routine mechanical servicing on workshop equipment and the likely results of not carrying this out.

At the end of this activity, learners will have an inventory of workshop equipment, be able to recognise and refer to each item by name, and have some understanding of their servicing requirements.

(Tutors may choose to involve the workshop technician whose job it is to service the equipment. This person will be a key figure for learners throughout this unit.)

Suggested time: about 3 hours.

Activity: Visit to a factory

Learners undertake a supervised visit to a local company to meet the maintenance team and undertake a tour of the factory. The maintenance engineers point out items of equipment and demonstrate how they plan to carry out routine servicing of these items. Tutors should record the technical language used and provide a crib sheet of terminology for learners. It is important to explore the reasons for equipment maintenance in a factory setting and ask for examples of service plans.

Through group discussion, tutors prepare learners for the visit by getting them to prepare questions in advance. Let the company know what you require from the visit and provide a copy of the questions and the unit specification in advance. This will help them to prepare for your visit. Ensure that learners ask about career opportunities in this area of employment.

Suggested time: about 6 hours.

Activity: Demonstration and health and safety

Either the workshop technician or tutors perform a simple, routine, mechanical service on an item of workshop equipment. Each step of the service is clearly explained. Learners fill in a blank service plan as the demonstration progresses.

With the help of group discussion, learners complete their service plans accurately and include all essential information, i.e. type of equipment, type of service, equipment information, step-by-step action plan, service tools and equipment required, replacement parts, resources and materials, health and safety, PPE, estimated time for completing the activity and returning the equipment to good working order. Emphasise good housekeeping skills and the reasons for carrying out the service.

Tutors recap what was done in the demonstration and go over each step in order to emphasise health and safety and procedures, drawing on what learners have observed and recorded on their plans.

Suggested time: about 8 hours.

Activity: Servicing carousel

Tutors may choose to use just workshop equipment or to introduce other items of equipment into a carousel arrangement. The size of the group will determine how many items will be required. Working in pairs, learners are given a service plan for each item of equipment. They prepare for and carry out simple, routine service activities on a range of equipment, following the plans. Each pair should complete at least three or four services, returning each item to good working order and producing a brief service report and an evaluation of their performance. They will suggest ways in which they could improve their skills.

Tutors and workshop technician will observe and support learners as they carry out their servicing activities.

Suggested time: about 8 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

Modern engineering organisations must ensure that the equipment they use is correctly serviced and maintained in order to improve reliability, maintain safety, avoid breakdown, and comply with the manufacturer's warranty. Some organisations employ their own service engineers while others subcontract this work to specialist companies.

Your centre has decided to keep this function in house and has drawn up a list of engineering items and equipment that require regular routine servicing. You have been asked to carry out a routine mechanical service on a specified item of equipment. Your tutor or other responsible person, for example the workshop technician, will give you a service plan and all the necessary information to complete the service. They will ensure that you have all the required tools, equipment, resources, materials, parts, and PPE to carry out the service in a safe and secure environment.

You will carry out the required service on the given item of equipment by following the service plan, maintaining good organisational and housekeeping skills, and returning the equipment in good working order. When you have finished, you will be asked to complete a service report.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

You will be given a different scenario and carry out a different service on another item of equipment, one that you have not worked on previously and which has a similar level of complexity as the first. For example, equipment that your centre has taken in from another engineering organisation that does not employ their own service engineers.

Unit ENG10: Carrying Out an Electrical Installation

Level: **1**

Unit type: **Sector (Engineering)**

Guided learning hours: **40**

Unit in brief

Learners will develop basic skills in electrical installation, testing and setting up a safe working environment.

Unit introduction

Our need for electricity grows every year. This means that there is a growing need for qualified electricians. Constructing electrical installations can be physical work but it also gives you the chance to solve problems.

In this unit, you will learn how to set up your work area safely and how to select and use tools and equipment to build an electrical installation. You will learn why it is important to follow the instructions in a given plan. You will work practically, with your hands, to solve problems. You will carry out simple tests to make sure your installation is safe to be tested by an electrician. You will also make sure that all tools are checked and safely stored away.

The transferable and sector skills you develop in this unit can enable you to progress to further learning. They will also support you in completing the core skills units in Group A of the qualification.

Learning aims

In this unit you will:

- A** Use a given plan to construct an electrical installation
- B** Carry out visual checks on an electrical installation safely.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
<p>A Use a given plan to construct an electrical installation</p>	<ul style="list-style-type: none"> • Basic electrical safety • Selection and safe use of tools and electrical accessories • Lighting circuits • Hand skills in carrying out a safe electrical installation • Visual inspection and safety checks • Restoring the workplace to a safe condition • Reviewing the electrical installation • Reviewing own performance 	<ul style="list-style-type: none"> • Annotated photographs taken at different stages of construction of the electrical installation(s), supported by tutor observations. • A written report or recorded discussion about learner performance.
<p>B Carry out visual checks on an electrical installation safely</p>		
<p>Key teaching areas include:</p>		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> • Preparing the workplace • Installing cables, devices, switches and outlets to a given design specification in accordance with electrical installation regulations • Terminating cables to connect to the electrical accessories • Visual inspection and simple checks prior to inspection by a competent electrician • Maintaining work records 	<ul style="list-style-type: none"> • Awareness of electrical safety regulations and the importance of BS 7671:2008 incorporating amendment 3:2015 • Types of electrical lighting circuits • Identification of electrical accessories • Colour coding of cables for electrical lighting circuits 	<ul style="list-style-type: none"> • Managing information • Reviewing own performance and electrical installation

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> • Read and understand texts, using information from the text. • Present information/points of view clearly and in an appropriate form.
Mathematics	<ul style="list-style-type: none"> • Add, subtract, multiply and divide whole numbers using a range of strategies. • Extract and interpret information from tables, diagrams, charts and graphs.

Unit content

Knowledge and sector skills

Basic electrical safety

- Awareness of electrical hazards and understanding who is at risk from electricity.
- Understanding the need to:
 - isolate from the supply before starting work and ensure that no one can reconnect the supply without permission
 - only work on electrical or other hazardous equipment under adequate supervision
 - visually inspect all cables and portable appliances before using them
 - not use equipment if there are any problems and to report the faults immediately
 - not attempt to reconnect the supply until the work has been checked by a competent electrician.

Selection and safe use of tools and electrical accessories

- The importance of choosing the right tool for the task and understanding how to use the tool safely and effectively, to include:
 - wire strippers
 - pliers
 - hammers
 - spirit level
 - measuring tape
 - insulated screwdrivers
 - battery-powered drill/screwdriver.
- Identifying and using:
 - ceiling rose
 - junction box
 - cables, e.g. flat 2-core with circuit protective conductor (cpc)
 - fixings, e.g. p-clips
 - single gang two-way switches, e.g. single pole double throw (SPDT)
 - various types of lamp holder, e.g. Edison (screw fit), bayonet.

Lighting circuits

Circuit diagrams, line diagrams and layouts for:

- multiple-point radial (loop in), for an installation with two single one-way switch operated drops
- additional drop with two-way operation, to give a combined one-way and two-way switch lighting circuit arrangement.

Hand skills in carrying out a safe electrical installation

- Marking out the positions of equipment and cable runs.
- Securing back-boxes in position correctly.
- Laying out the correct type and size of PVC-sheathed cable to the required shape and cut to length without causing damage.
- Securing the PVC sheathed cable using the given supports, e.g. clips.
- Stripping and terminating PVC sheathed conductors at accessory points to form a given lighting circuit.
- Identifying, sleeving and terminating protective conductors at lamp holders.

Visual inspection and safety checks

- Completing the visual inspection schedule for each circuit installed, e.g. no bare conductors showing, no loose 'whiskers', all connections tightened correctly, cable runs straight, cables not too tight or too loose, cables do not change direction too sharply.
- Continuity test using a suitable test instrument, e.g. multimeter, continuity tester.

Good housekeeping in the workplace

- Checking that the worksite is kept clear and is left in a safe and satisfactory condition when the work is completed.
- Ensuring that tools, equipment and materials are stored safely and securely.

Reviewing the electrical installation:

Identifying:

- if the electrical installation follows the given circuit information
- if it is fit for purpose
- improvements to the quality of the final electrical installation.

Reviewing own performance

- Using a given template, review own ability to:
 - select and use appropriate equipment and materials
 - follow a method safely in correct sequence
 - use appropriate techniques.
- Make recommendations for improvements in own performance.

Transferable skills

- Managing information: collecting and using information, e.g. circuit diagrams and layouts, cable sizes; organising information; keeping documents tidy and in order; using numbers, e.g. measurements from layouts; checking units and measuring accurately.
- Reviewing own performance and electrical installation: identifying own strengths and weaknesses in performing a task; ways to improve own performance; testing that the product is fit for purpose; suggestions for improvements to the method in order to improve the quality of the product.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Use a given plan to construct an electrical installation		
A.P1 Perform, using a given plan, activities to construct a one-way electrical lighting circuit.	A.M1 Construct, using a given plan appropriately, a one-way and two-way combined electrical lighting circuit.	A.D1 Construct, using a given plan accurately and effectively, a fully functional combined electrical lighting circuit.
Learning aim B: Carry out visual checks on an electrical installation safely		
B.P2 Carry out visual checks to review the constructed electrical lighting installation and identify a strength of your own performance.	B.M2 Carry out visual checks to review the constructed electrical lighting installation and identify a strength and a weakness of your own performance.	B.D2 Carry out visual checks, make good any defects and identify strengths and weaknesses of your own performance, making a recommendation for improvement.

Essential information for tutors

A working rig could be demonstrated and left on view for learners to compare with their own installation.

Learners will be given detailed drawings and plans from which to construct an electrical lighting installation with two single one-way switch operated lamps and one two-way switch operated lamp. It would make the task more interesting if different types of lamp holder were used for each lamp but this is not essential.

The information supplied to learners should be sufficient that they can carry out well-defined routine tasks such as measuring and marking out from given dimensions, and stripping and terminating single- and multi-core cables. Carrying out visual checks of their own installation will allow them to demonstrate that they can identify whether actions have been effective. The focus of this unit is to develop practical skills in as realistic an environment as possible.

Each learner should have adequate room to work safely. It is expected that learners will use wiring boards for their installations. These should be supplied with the materials and accessories required to complete the installation.

Learners should **not** be allowed to connect their installations to a live supply but it could prove a positive experience for learners if staff were able to demonstrate the installation working, following appropriate safety tests.

Essential information for assessment decisions

For distinction standard, learners:

- manage information effectively from a given plan to enable an accurate interpretation of a physical layout, e.g. with regular reference to a circuit diagram, collecting tools and materials with full reference to a bill of materials, and using information from preparation and implementation that will result in a fully functioning circuit
- construct the lighting circuit by, e.g. marking out and placing accessories and cables in positions that are accurate relative to the given plan, ensuring that the cable runs at 90° and is secured correctly, changing cable direction with full consideration to neatness and the bend radius, cutting cables to the correct length with cables not in tension, keeping cable ends tidy without any nicking of the conductor, terminating cables with no 'whiskers' or bare conductor showing, and insulating earth connections using appropriate sheathing to the correct length, with no bunching and no bare conductor showing
- carry out continuous visual inspection of the installation and analyse the outcomes, identifying potential causes for concern and determining whether actions have been effective. Learners complete a visual inspection schedule identifying potential hazards and corrective actions to be taken
- review their own performance by identifying strengths and weaknesses and making recommended improvements, e.g. completing the installation so that it is safe and secure but having to rush to complete it in time, meaning that in future tools should be laid out in a more organised fashion and materials should be pre-prepared.

For merit standard, learners:

- manage information from a given plan that will enable an appropriate interpretation of a physical layout, e.g. with reference to a circuit diagram, collecting tools and materials with reference to a bill of materials, and using information from preparation and implementation that will result in a workable circuit
- construct the lighting circuit by, e.g. placing accessories and cables in positions that are mostly accurate relative to the given plan, ensuring that the cable runs mostly at 90° and is secured correctly, changing cable direction with some consideration to neatness or the bend radius, cutting cables to mostly the correct length with most cables not in tension, keeping cable ends mostly tidy without any nicking of the conductor, terminating cables with few or no 'whiskers' or bare conductor showing, and insulating earth connections using appropriate sheathing with some cut to the wrong length, resulting in bunching or small lengths of bare conductor showing
- carry out a visual inspection of the installation that identifies potential causes for concern and determines whether actions have been effective. Learners complete a visual inspection schedule identifying potential hazards
- review their own performance by identifying a strength and a weakness, e.g. completing the installation so that it is safe and secure but having to rush to complete it in time.

For pass standard, learners:

- manage information from a given plan that may enable limited interpretation of a physical layout, e.g. without reference to a circuit diagram, collecting tools and materials with limited reference to a bill of materials, and using information from preparation and implementation that will not enable an effective circuit
- construct the lighting circuit by, e.g. placing accessories and cables in an inaccurate position relative to the given plan, running cables not at 90° or securing them correctly, changing cable direction with little consideration to neatness or the bend radius, cutting cables to the wrong length or with cables under slight tension, leaving cable ends untidy or the conductor slightly nicked, terminating cables with 'whiskers' and/or some bare conductor showing, and insulating earth connections with ragged sheathing or with sheathing not cut to the appropriate length
- carry out a visual inspection of the installation that identifies some simple causes for concern and complete a visual inspection record
- review their own performance by identifying a basic strength of their own performance, e.g. completing within the allocated time or doing everything safely.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutors demonstrate the correct use of hand tools that learners can use to carry out practical activities, to include:

- measuring and marking out from a given plan
- fixing back panels to a board from a plan
- securing cable.

Learners then measure out from a given plan and secure the back panels to a board.

Learners could identify positive and negative aspects of their own and each other's work.

Suggested time: about 4 hours.

Activity: Using hand tools

Tutors review the previous activities.

Learners complete exercises that involve cutting cable to length, stripping and terminating ends and colour coding, e.g. wiring a 3-pin plug. Different types of cable and terminations can be used. Learners carry out visual checks and identify positive and negative aspects of their own and each other's work.

Suggested time: about 6 hours.

Activity: Electrical safety in industry

A guest speaker, e.g. an electrical contractor, is invited to speak about what an electrician does and the importance of electrical safety (or this could be a member of staff with industrial experience). Learners take part in a discussion on electrical safety and ask the speaker questions. The discussion should include identification of hazards and estimation of risk and control measures.

Learners design electrical safety posters as part of the workshop (possibly for a competition).

Suggested time: about 2 hours.

Activity: Interpreting a wiring diagram (multiple drop radial (loop in))

Tutors demonstrate a working installation with a single lighting circuit, which could be left on display for learners to compare with their own installation. Learners identify the electrical accessories and their functions.

Learners identify and list the component parts of a given wiring diagram for a multiple drop radial (loop in) circuit with two single one-way switch operated drops.

Learners collect the components required and build the installation to the given plan. Learners should be encouraged to visually inspect their installation and correct defects as they go along.

Suggested time: about 4 hours.

Activity: Interpreting a wiring diagram – two-way switch

Tutors demonstrate a working installation with single and double switch lighting circuits, which could be left on display for learners to compare with their own installation. Learners identify the additional electrical accessories and their functions.

Learners identify, list and collect the additional component parts for the given wiring diagram for a multiple drop radial (loop in) circuit that is modified to include a third drop operated by a two-way switch.

Learners complete the additions to the electrical installation. Learners should be encouraged to carry out visual inspection and correct defects as they go along.

Suggested time: about 4 hours.

Activity: Carrying out visual checks and repairs

Tutors introduce a checklist for visual inspection and explain how to complete it.

Learners complete a checklist for their own installation. They then correct the defects and faults they have identified and note the repairs carried out.

Learners could compare their checks with others to identify common faults/errors.

Plenary session, e.g. why it is important to keep accurate records; what is the advantage of carrying out visual checks and rectifying problems as you go along?

Suggested time: about 4 hours.

Activity: Carrying out simple continuity checks

Tutors demonstrate how to use simple testing equipment to carry out a continuity test, identify defects and correct them. They also demonstrate how to complete the given report form.

Learners carry out a simple continuity test on their own installation. They identify any gaps in continuity and undertake repairs.

Learners then complete the supplied report form to identify the initial test results, the faults identified and the actions taken to correct them.

Suggested time: about 4 hours.

Activity: Restoring the workplace to a safe condition

Learners remove all materials and tools and store them safely and securely, leaving the workplace in a safe condition.

Suggested time: about 1 hour.

Activity: Skills for reviewing electrical installation and their performance

Learners develop skills in reviewing their own performance, e.g. tutors get learners to think generally about what they are good at and the areas they need to improve in.

Learners will reflect on their own performance in terms of their personal strengths and weaknesses.

Tutors will provide a template for learners to use, asking questions for them to answer based on their performance.

Suggested time: about 4 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

The centre where you are training is having an open day. Your supervisor wants to demonstrate how 'hands-on' the course is and how learners are taught to use hand tools to construct an electrical installation from a given plan. Your supervisor gives you all the instructions and drawings needed to carry out the installation of an electrical lighting circuit, which will be used as part of the display. They ask you to carry out the electrical lighting installation, performing the identified tasks safely and accurately.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

The assessment should essentially be the same, i.e. the installation of a lighting circuit with one-way and two-way circuits, but using different layouts and components, for example using a junction box rather than connecting directly to a ceiling rose.

Unit ENG11: Producing Engineering Drawings Using CAD

Level: **1**

Unit type: **Sector (Engineering)**

Guided learning hours: **40**

Unit in brief

Learners will develop skills in preparing and producing engineered drawings using a 2D CAD (computer-aided design) system.

Unit introduction

Have you ever wondered what CAD is, and how it is used in engineering? CAD has replaced some drawing boards in engineering, using computer technology to create 2D and 3D components.

This unit will give you an introduction to 2D CAD and enable you to produce engineering drawings. CAD spans most areas of engineering and aspects of other industries, such as construction and media. Engineering is multidisciplinary, making highly technological products. For example, the automotive industry designs cars using CAD. You will learn to use CAD software and hardware to produce 2D templates and engineering drawings. You will develop the skills to produce drawings of engineering products, edit these and print your portfolio of drawings.

The transferable and sector skills you develop in this unit can enable you to progress to further learning. They will also support you in completing the core skills units in Group A of the qualification.

Learning aims

In this unit you will:

- A** Produce a template and drawing of a component and communicate engineering information using 2D CAD software
- B** Present to others about the use of 2D CAD software.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
<p>A Produce a template and drawing of a component and communicate engineering information using 2D CAD software</p>	<ul style="list-style-type: none"> • Setting up a CAD template and engineering drawing • Producing a CAD template • Producing an engineering drawing using CAD 	<ul style="list-style-type: none"> • Annotated screenshots and drawings. • A template and a CAD drawing for assessment. • Presentation of the CAD drawings, supported by tutor observations.
<p>B Present to others about the use of 2D CAD software</p>	<ul style="list-style-type: none"> • Products/components • Presenting information and communication techniques 	
<p>Key teaching areas include:</p>		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> • Understanding drawing terminology and standards, e.g. BS 8888 • Preparing a CAD template • Drawing an engineering product using CAD 	<ul style="list-style-type: none"> • Different types of CAD drawings • The different skills needed to produce drawings • Drawing standards • Safety and visual display units (VDUs) 	<ul style="list-style-type: none"> • Communication • Presenting information

There are opportunities to develop functional skills in this unit:

Functional skills	
<p>English</p>	<ul style="list-style-type: none"> • Utilise information contained in texts. • Write clearly and coherently, including an appropriate level of detail. • Use language, format and structure suitable for purpose and audience. • Present information in a logical sequence.
<p>Mathematics</p>	<ul style="list-style-type: none"> • Understand and use whole numbers and understand negative numbers in practical contexts. • Add, subtract, multiply and divide whole numbers using a range of strategies. • Solve problems requiring calculation with common measures, including money, time, length, weight, capacity and temperature.

Unit content

Knowledge and sector skills

Setting up a CAD template and engineering drawing

- Setting up the CAD system, e.g. line types, grid, snap, paper size.
- Drawing and editing commands, e.g. to produce and erase lines, circles, text, arcs, polygons, trim, move, copy, undo, dimensioning, hatching, scaling and rotating.
- Manipulation of views, including zoom and pan options.
- Saving the template/drawing data in an appropriate format.
- Outputting to a printer/plotter.

Producing a CAD template

- A3 or A4 template, to include drawing number(s), projection symbols, scale, units, general tolerances, name of author, drawing title, date, border.

Producing an engineering drawing using CAD

- Producing drawings to a current standard, e.g. BS 8888:
 - line types, e.g. centre, construction, outline, dimension
 - common features, e.g. holes, chamfers, radii
 - lettering, e.g. title, notes, annotation
 - abbreviations, e.g. CHAM, DIA, A/F.
- Creation of engineering drawings, to include orthogonal views, appropriate scale, dimensioning and centre lines.

Engineered products/components

- A drill gauge containing two different sized radii, chamfers, an array of different sized drill holes and a set of threaded holes in an appropriate order with correct annotation.
- A drill gauge with at least one chamfer, and an array of different sized drill holes.

Presenting information techniques

- Reporting information on the methods and use of CAD software to produce an engineering drawing, using appropriate presentation techniques.
- Using presentation techniques to feed back on the use of CAD software, to include oral, written and graphical material.
- Presenting information on the use of CAD software, e.g. Word®, PowerPoint®, blog, vlog.

Transferable skills

- Communication: creation of a drawing template, creation of an engineering drawing, screenshots, outputting to a paper copy, interpretation of ideas through drawings, using appropriate ways to show how 2D CAD software has been used.
- Presenting information: verbal communication skills (tone of voice, clarity, using language, format and structure suitable for purpose and audience); appropriate non-verbal communication (eye contact, posture); allowing for and responding to others' input.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Produce a template and drawing of a component and communicate engineering information using 2D CAD software		
A.P1 Produce a CAD template and drawing of an engineered component using limited drawing and editing commands.	A.M1 Produce a suitable CAD template and drawing of an engineered component using a range of drawing and editing commands.	A.D1 Produce an accurate CAD template and drawing of an engineered component using layers and to current standards.
A.P2 Communicate engineering information using 2D CAD software.	A.M2 Communicate engineering information appropriately using 2D CAD software.	A.D2 Communicate engineering information clearly and appropriately using 2D CAD software.
Learning aim B: Present to others about the use of 2D CAD software		
B.P3 Present limited information about the use of 2D CAD software.	B.M3 Present information appropriately about the use of different types of 2D CAD software.	B.D3 Present information effectively about the use of different types of 2D CAD software.

Essential information for tutors

This unit can be taught using a range of suitable 2D CAD packages, e.g. AutoCAD®, SolidWorks®, DraftSight™, AutoCAD LT®, TechSoft Design®, AutoSketch®, TurboCAD®

Essential information for assessment decisions

Learners should create an accurate A3 or A4 drawing template. They should prepare engineering drawings in an orthogonal format, to current standards.

An appropriate form of assessment for presenting information about the use of 2D CAD would be a verbal presentation.

For distinction standard, learners:

- create an accurate template with appropriate information about the drawing, e.g. units, name of author, date, border, scale, drawing number(s), general tolerances and projection symbols
- use separate layers to create an accurate template and drawing that could be understood by a third party to manufacture the engineered product, with a range of commands to create accurate projections and to include correct line types and dimensions, e.g. all the features of the drawing will be present, and the representation of the engineered product will be correct with accurate alignment of projections and dimensioning
- create documentation that includes accurate information about the use of 2D CAD software that will concentrate on the use of layers and drawing and editing commands and will contain accurate text, e.g. command structure and the use of layers is understood, appropriate drawing and editing commands are used for specific functions and features
- present accurate and targeted information to others that will focus on the CAD software and will be readily understood, e.g. in a clear and structured format with appropriate tone of voice, body language and engagement with others.

For merit standard, learners:

- create a suitable template with appropriate information about the drawing, e.g. units, name of author, date, border and scale
- create an accurate drawing that could be understood by a third party, with a range of commands to create mostly accurate projections and to include suitable line types and dimensions, e.g. all the features of the drawing will be present, and the representation of the engineered product will be accurate, but there may be minor inaccuracies with the alignment of projections and dimensioning
- create documentation that includes accurate information about the use of 2D CAD software that will concentrate on most of the commands used and will contain mainly accurate text, e.g. command structure is understood, appropriate commands used for specific features
- present appropriate information to others that will focus on CAD software and will be readily understood, e.g. in a clear and structured format, but may lack some detail, with only partial awareness of body language and engagement with others.

For pass standard, learners:

- create a template with some appropriate information about the drawing, e.g. name of author, drawing title
- create a drawing with a limited set of commands to create recognisable views (elevation, plan and end) and to include basic line types and dimensions, e.g. the main features of the drawing will be present but there will be inaccuracies with the alignment of views, representation of the engineering product and dimensioning
- create documentation that includes information about the use of 2D CAD software that will concentrate on three or more commands and will contain inaccuracies in the text, e.g. command structure misunderstood, inappropriate commands used for specific features
- present limited information to others that will focus on CAD software but will be difficult for them to understand, e.g. unclear or unstructured, inappropriate tone of voice and little awareness of body language and engagement with others.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutors explain and demonstrate the setting up of a CAD system, using drawing and editing commands.

Tutors demonstrate the setting up of parameters of a CAD package, e.g. drawing size, grid, snap, line types, use of folders and saving, to include practical demonstration of drawing and editing commands.

Learners practise the required skills, e.g. setting up a CAD package using drawing size, grid, snap, line types to draw simple items (size and scale are not important at this point) and outputting their drawings to a printer.

It is recommended that a visit to an engineering design office is incorporated into the teaching and learning programme.

Suggested time: about 5 hours.

Activity: Creation of drawing parameters

Tutors explain and demonstrate the creation of drawing parameters.

Tutors demonstrate the use of drawing templates, orthogonal views and layers.

Learners practise the required skills, e.g. drawing templates, orthogonal views and the use of layers.

It is recommended that a visit to an engineering design office is incorporated into the teaching and learning programme.

Suggested time: about 3 hours.

Activity: Creation of engineered drawings

Tutors explain and demonstrate the creation of engineered drawings.

Learners practise the required skills using given engineering drawings, e.g. tee piece, stepped shaft, end plate.

From given drawings of simple engineering components, learners practise creating orthogonal drawings and dimensioning them, with support from tutors, e.g. depth gauge, bevel gauge, plumb bob.

Suggested time: about 16 hours.

Activity: Insert mechanical drawing into a drawing template

Tutors explain and demonstrate the insertion of an engineering drawing into a template.

Learners practise the required skills using their own and given engineering drawings, e.g. engineering drawing inserted within a previously created drawing template.

Suggested time: about 2 hours.

Activity: Communicating and presenting information

Tutors explain different styles and methods of communication and presenting, including the appropriate tone of voice, clarity, using appropriate language, format and structure that is suitable for the audience.

Tutors explain how to present information on learner drawings, including the interpretation of drawings and the commands used to create the drawings.

Tutors explain different styles and methods of communication and presenting, e.g.:

- communicating – oral, written, graphical
- presenting information – Word, PowerPoint, blog, vlog
- essay, leaflet, poster
- text, images, photos, tables, charts.

Learners present to their peer group.

Suggested time: about 3 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity.

Suggested scenario

You have been learning to use CAD and traditional drawing in your centre, to produce different types of drawings with the aid of colleagues who use traditional sketching, drawing and CAD.

Your tutor wants to create a drawing template, and then move on to creating small circuits and mechanical drawings on the CAD system.

As you create these drawings, you will need to produce annotated screenshots to show your tutor, demonstrating the process of using commands to create your template and drawings.

If a retake assessment is necessary, an alternative activity must be used. The following is an example of a retake assessment activity.

Your tutor has asked you to produce a different drawing template, and then move on to creating different small circuits and a different mechanical drawing on the CAD system.

As you create these drawings, you will need to produce annotated screenshots to show your tutor, demonstrating the process of using commands to create your template and drawings.

Unit ENG12: Carrying Out Routine Service Tasks on a Motor Vehicle

Level: **1**

Unit type: **Sector (Engineering)**

Guided learning hours: **40**

Unit in brief

Learners will develop the practical skills required to prepare for and complete the routine maintenance tasks performed during the servicing of a motor vehicle.

Unit introduction

Cars, vans and motorbikes are used every day by millions of people around the world. Technology has made modern vehicles reliable and safe but parts still wear out and even modern engine oil will need replacing at least once a year. It is important that regular checks are made on the parts that are known to wear out most quickly or could cause an accident if they fail to work properly. For instance you should check the pressure in your tyres and their condition every time you fill up with fuel. Other checks should be made at least once a year like the condition of brake pads and some things like engine oil should simply be replaced with new oil every so often. These checks and the routine renewal of certain fluids and filters are carried out in a vehicle service.

In this unit, you will carry out a range of motor vehicle servicing procedures safely. You will learn to assess the condition of a range of parts checked during a service and replace those that are worn. It is important that you are able to find out and use certain technical information needed to complete a service.

This unit will help you to develop skills to progress to qualifications in different sectors as well as to progress to other qualifications in engineering. The transferable and sector skills you develop in this unit can enable you to progress to further learning. They will also support you in completing the core skills units in Group A of the qualification.

Learning aims

In this unit you will:

- A** Carry out routine service tasks on a motor vehicle safely
- B** Demonstrate communication skills when dealing with customers.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
<p>A Carry out a routine service tasks on a motor vehicle safely</p>	<ul style="list-style-type: none"> • Preparation for carrying out routine service tasks • Safe working practices when carrying out motor vehicle servicing 	<ul style="list-style-type: none"> • Portfolio of evidence, including: <ul style="list-style-type: none"> ○ service checklist ○ complete servicing records.
<p>B Demonstrate communication skills when dealing with customers</p>	<ul style="list-style-type: none"> • Routine service tasks • Tools and equipment • Completing servicing records 	<ul style="list-style-type: none"> • Tutors' observation records on: <ul style="list-style-type: none"> ○ practical tasks ○ communicating information to customer.
<p>Key teaching areas include:</p>		
Sector skills	Knowledge	Transferable skills
<ul style="list-style-type: none"> • Accessing and using technical data • Applying safe working practices in an automotive environment • Carrying out common servicing procedures safely • Using appropriate tools and equipment safely 	<ul style="list-style-type: none"> • Requirements and importance of safe working practices • Motor vehicle systems, operation and naming of parts • Types and grades of engine oil and other fluids 	<ul style="list-style-type: none"> • Managing information • Communication

There are opportunities to develop functional skills in this unit:

Functional skills	
English	<ul style="list-style-type: none"> • Utilise information contained in texts. • Use language, format and structure suitable for purpose and audience.
Mathematics	<ul style="list-style-type: none"> • Extract and interpret information from tables, diagrams, charts and graphs.

Unit content

Knowledge and sector skills

Preparation for carrying out routine service tasks

- Access to servicing guidance, to include manufacturer's workshop manuals, owner's workshop manuals, labour time manuals.
- Use of routine vehicle servicing schedules.
- Technical data: parts databases, technical data manuals, component or consumable product labelling and data sheets.

Safe working practices when carrying out motor vehicle servicing

- Important general safety considerations when working in an automotive workshop, to include awareness of moving vehicles, impact, trapping and entanglement in moving parts or lifting equipment, use of appropriate personal protective equipment (PPE), maintaining a tidy work area.
- Safe working practices relevant to servicing procedures, to include safe handling of engine oil and other fluids, correct disposal of waste products, dealing with spillages, correct use of tools and equipment, including those using compressed air, avoiding contact with high temperature fluids or components.

Routine service tasks

- Safe removal, disposal and replacement of service consumable items, to include engine oil, oil filter, air filter, fuel filter (diesel), spark plugs (petrol).
- Condition assessment, safe removal, disposal and replacement of other items checked during a service, to include tyres, engine coolant, headlight and ancillary bulbs, fuses, brake pads or shoes, batteries, auxiliary drive belt, windscreen wipers.
- Fluid level checks and top up, to include engine oil, clutch fluid, brake fluid, power steering fluid, automatic transmission fluid, gearbox oil, differential oil, windscreen washer fluid, coolant.

Tools and equipment

- Safe and appropriate use of general and automotive workshop tools and equipment, to include general hand tools, airline and tyre inflator, tyre pressure gauge, pneumatic impact wrench, feeler gauges, tyre tread depth gauge, vehicle lifts and jacks, oil filter wrench.

Completing servicing records

- Servicing records, to include copies of any technical information used, service checklist, manufacturer's part number of any replacement parts used, type and grade of any replacement fluids, vehicle registration number, manufacturer, model, year of manufacture, mileage.

Transferable skills

- Managing information: finding manufacturers' recommended service schedules, looking up component replacement procedures for a given part, looking up the type, grade and required quantities of replacement oil and other fluids, looking up manufacturer's part number for replacement parts.
- Communication: completing written servicing records, explaining the work carried out to a customer.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Carry out routine service tasks on a motor vehicle safely		
A.P1 Produce an outline service checklist using information from given sources.	A.M1 Produce a service checklist, selecting information from given sources.	A.D1 Produce a service checklist, selecting appropriate information from own and given sources.
A.P2 Carry out servicing procedures safely and complete servicing records.	A.M2 Carry out servicing procedures safely, following a service checklist and complete detailed servicing records.	A.D2 Carry out servicing procedures safely and effectively, completing an appropriate service checklist and detailed servicing records accurately.
Learning aim B: Demonstrate communication skills when dealing with customers		
B.P3 Demonstrate simple communication skills when providing information verbally to a customer.	B.M3 Demonstrate appropriate communication skills when providing information verbally to a customer.	B.D3 Demonstrate effective communication skills when providing information verbally to a customer.

Essential information for teachers

Essential information for assessment decisions

For distinction standard, learners:

- produce a detailed checklist using information selected from a range of resources, some given and some of their own. They select accurate technical information needed to carry out a service on a vehicle such as the part number for a replacement oil filter or the type and quantity of engine oil required by the vehicle being serviced
- carry out all the service procedures on an appropriate service checklist safely and effectively, e.g. assessing fluid levels and the condition of checked parts correctly, for instance identifying that a split wiper blade needs to be replaced
- complete part replacement procedures safely and effectively using appropriate tools, e.g. replacing a worn tyre or changing the oil and filter in an engine
- complete servicing records clearly and accurately, recording vehicle details, part numbers, quantities and types of replacement fluids such as engine oil
- explain the work carried out clearly and effectively to a customer, using appropriate technical language and a professional and courteous manner.

For merit standard, learners:

- produce a checklist using information from resources that have been given to them. They include mostly accurate technical information needed to carry out a service on a vehicle, such as the part number for a replacement wiper blade or the type and quantity of engine coolant required by the vehicle being serviced
- carry out the procedures on a checklist safely, missing only a few of the steps, e.g. assessing fluid levels and the condition of checked components correctly in all but a few cases, for instance they might have identified that a blown bulb needs to be replaced and brake fluid requires topping up but failed to notice a split wiper blade
- complete part replacement procedures safely using appropriate tools, but will have made a few minor errors such as overfilling the brake fluid reservoir or failing to refit one of the screws securing a brake light lens after replacing a bulb
- complete servicing records clearly but with a few instances of missing information or inaccuracy
- explain the work carried out clearly to a customer, using some appropriate technical language and a professional and courteous manner but with a few instances of missing information or inaccuracy.

For pass standard, learners:

- produce a simple checklist that uses information from given sources and includes basic information such as part numbers, although this may not always be accurately recorded
- carry out the procedures on a checklist safely, but not in the specified order, and missing several steps, e.g. assessing fluid levels and the condition of checked components correctly in only some cases, for instance they may have identified that a blown bulb needs replacing but failed to notice a worn tyre, low brake fluid level and a split wiper blade
- complete part-replacement procedures safely using appropriate tools but will have made significant errors that may damage the vehicle or leave it unsafe. A safety issue may be that tyres have been significantly under inflated or wheel nuts have not been properly tightened
- complete servicing records but with significant missing information or inaccuracy
- explain the work carried out to a customer with frequent inaccuracies, missing information, a lack of clarity or using informal language lacking in professionalism.

Essential resources

For this unit, learners will need access to:

- servicing and technical data manuals and reference material
- appropriate vehicle workshop facilities, tools, equipment and components
- appropriate vehicles on which to carry out servicing checks and procedures.

Delivery guidance

It is recommended that practical activities are used in the delivery of this unit to help learners develop both the core and sector skills. The following are suggestions for activities and workshops that tutors can use in preparation for the final assessment and are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

An explanation is given about some of the main systems present in modern motor vehicles.

In small groups, learners consider the different types of systems and how they work together to allow the safe and reliable function of cars, vans or motorbikes. For example, engine, transmission, brakes, suspension etc.

Once the main systems have been identified and their functions discussed, learners should be asked to consider what might go wrong in some of these systems and what the consequences of individual component failure might be.

Each group of learners should make a list of what components and systems should be checked regularly so that an unplanned breakdown or accident might be avoided. This should be compared with the servicing schedules available in owner's workshop manuals or from online research into the checks made by garages that provide vehicle servicing.

Suggested time: about 3 hours.

Activity: Industrial visit – putting the unit into context

Learners go on a supervised industrial visit to a local company providing vehicle servicing.

This might be the workshops of a main dealer, a national chain or local independent garage.

This will help put the unit into a real-life commercial context and allow learners to see how professional vehicle technicians carry out their duties. They will also gain an insight into the use of specialist tools and equipment that may not be available in their centre and have the opportunity to ask questions about safe working practices or other aspects of the job.

Suggested time: about 3 hours.

Activity: Accessing technical data

Tutors demonstrate the usefulness of different sources of technical and servicing data that they will have been introduced to during the industrial visit. This might include hard copy, computer database and online resources as detailed in the unit content.

In small groups, learners could be asked to find certain pieces of data in real time, competing against their peers in other groups. For example, which group can be first to identify the manufacturer's part number for a replacement oil filter on a 07 plate Audi A3 2.0 TDI SE.

Suggested time: about 2 hours.

Activity: How do you know when a component needs to be replaced?

Tutors demonstrate the checks that are carried out during a service and explain what they are looking for and why it is important to look for these things.

A series of new, part-worn and unserviceable components should be made available so that learners can recognise when components need to be replaced. These might include brake pads, windscreen wipers and tyres.

Learners should be given the opportunity to perform component checks in small groups and discuss the condition of a range of components and whether they should be replaced.

Suggested time: about 8 hours.

Activity: Practical tasks – replacing worn components

Tutors demonstrate the replacement of a full range of components that are covered in the service schedule, including windscreen wipers, bulbs, tyres, spark plugs etc.

This will include guidance on safe working practices and the appropriate use of a range of tools and equipment.

Learners should be given the opportunity to carry out these processes under supervision at least once before the completion of the assessment activities.

Suggested time: about 8 hours.

Activity: Practical tasks – checking fluid levels, topping up and replacing engine oil and filter

Tutors demonstrate checking and topping up fluids, including brake fluid, clutch fluid, coolant etc. This will be followed by tutors demonstrating how to replace the engine oil and filter.

The types of fluid, their safe handling, disposal and what to do in case of a spillage should be covered in detail.

Learners should be given the opportunity carry out these processes under supervision at least once before the completion of the assessment activities.

Suggested time: about 6 hours.

Activity: Practical task – carrying out a complete service

Following tutors' explanations and demonstrations of the knowledge and skills required to carry out a full vehicle service, small groups or individual learners should be given the opportunity to carry out a full service under supervision. During this activity, questions can be asked and developmental feedback given to improve learners' knowledge and skills. This will help build learners' confidence in preparation for assessment.

Suggested time: about 6 hours.

Suggested assessment activity

The summative assessment activity takes place after learners have completed their formative development. The assignment should be practical, be set in a realistic scenario and draw on learning from the unit, including transferable skills. You will need to give learners a clear period of time and number of hours in which to complete the activity.

Suggested scenario

As a trainee garage vehicle technician, you are asked to carry out some routine service tasks on a customer's vehicle. You must use the information on the vehicle type to produce an appropriate service checklist for the type, make, model and year of the vehicle you have been assigned to work on (see *Additional notes for tutors* below).

You must then carry out the checks and procedures listed on the service checklist, including checking the tyres, topping up some fluids and changing others.

You must use safe working practices at all times.

While working, you should record your activities on the servicing schedule checklist, including details of the vehicle, any replacement parts used and any other relevant notes and information, including the time taken to complete the service.

On completing the tasks, you will need to explain to the customer the procedures that needed to be carried out on their vehicle and any other important advisory information.

Additional notes for tutors

The vehicle used in this scenario might be a Ford Fiesta 1.5l DURATORQ TDCI 2012.

For this vehicle, an annual service would be carried out following the manufacturer's recommended service schedule below:

Ford Motor Company Service Schedule

Ford Fiesta 1.5l DURATORQ TDCI 2012.

If a resit assessment is necessary, an alternative activity must be used. The following is an example of a resit assessment activity.

You have now completed service tasks on a customer's vehicle in your role as a trainee vehicle technician. Your supervisor is now ready to assign you to complete work on a different vehicle that has come in for a service. Once again, you must obtain and follow an appropriate servicing schedule for the type, make, model and year of the vehicle you have been assigned to work on.

During the service, you must carry out all the checks and procedures listed on the service schedule, including identifying and fitting new parts, topping up some fluids and changing others.

You must use safe working practices at all times.

While working, you should record your activities on the servicing schedule checklist, including details of the vehicle, any replacement parts used and any other relevant notes and information, including the time taken to complete the service.

On completing the service, you will need to explain to the customer the procedures that needed to be carried out on their vehicle and any other important advisory information.

4 Planning your programme

How do I choose the right BTEC Introductory qualification for my learners?

BTEC Introductory qualifications come in three sizes, the Award, the Certificate and the Diploma, each with a specific purpose. You will need to assess learners carefully to ensure that they start on the right size of qualification to fit into their study programme. Some learners might start on the Award size, progress to the Certificate size and then on to the larger Diploma. They may then progress to a BTEC Level 2 qualification. Learners who have a clear idea of the sector they would like to study, could start on the Diploma qualification. All three sizes allow for learners to take complementary qualifications such as maths and English alongside their BTEC Introductory qualification.

It is not advised that learners take two Award or Certificate qualifications from different sectors. If learners want to study across two or more sectors, then you should consider offering a Pearson BTEC Level 1 Introductory Vocational Studies Certificate or Diploma. The Vocational Studies qualifications give learners a flavour of a number of different vocational sectors. When learners are recruited, you need to give them accurate information on the title and focus of the qualification for which they are studying.

Is there a learner entry requirement?

There are no formal entry requirements but all learners recruited should be able to access a Level 1 programme. As a centre, it is your responsibility to ensure that learners who are recruited make reasonable progress and are likely to achieve at this level.

Learners are most likely to succeed if they:

- have the personal motivation to succeed at this level and to progress to further study and, ultimately, to employment
- are willing to improve their maths and English skills.

What is involved in becoming an approved centre?

All centres must be approved before they can offer these qualifications, this is so that they are ready to assess learners and so that we can provide the support that it is needed. Further information is given in *Section 7*.

What level of sector knowledge is needed to teach these qualifications?

We do not set any requirements for tutors but recommend that centres assess the overall skills and knowledge of the teaching team to ensure that they are relevant and up to date. This will give learners a rich programme to prepare them for progression.

What resources are required to deliver these qualifications?

As part of your centre approval you will need to show that the necessary material resources and work spaces are available to deliver the qualifications. For some units, specific resources are required.

Which modes of delivery can be used for these qualifications?

You are free to deliver BTEC Introductory units using any form of delivery that meets the needs of your learners. We recommend making use of a wide variety of modes, including some direct instruction in classrooms or vocational environments, practical work, group- and peer work, private study and e-learning.

Support

It is important that you give learners opportunities for learning that are active, engaging and directly relevant to their study. To support you in this, each unit has delivery guidance and suggestions for the summative assessment activity.

What support is available?

We will provide a generic delivery guide which will give suggestions for how to deliver the core units and the transferable skills across the suite. This will be available to download on our website.

To support you in planning your assessments you will be allocated a Standards Verifier early on in the planning stage. See *Section 5* for further details.

5 Assessment

Introduction

All units in this specification are internally assessed and externally verified.

In administering assessments, you, as the centre, need to be aware of the specific procedures and policies that apply, for example for registration, entries and results. Information with signposting to relevant documents is given in *Section 7*.

This section gives an overview of the key features of internal assessment and how you, as an approved centre, can offer it effectively. The full requirements and operational information are given in the *Pearson Quality Assurance Handbook*. All members of your assessment team need to refer to this document.

For BTEC Introductory qualifications it is important that you can meet the needs of learners by providing a programme that is practical and which will develop transferable and sector skills in a vocational context. Centres can tailor programmes to meet local needs and use links with local organisations and the wider vocational sector.

We have addressed the need to ensure that the time allocated to final assessment of internal units is reasonable so that there is sufficient time for teaching and learning, formative assessment and development of transferable skills.

When internal assessment is operated effectively it is challenging, engaging, practical and up to date. It must also be fair to all learners.

Principles of internal assessment

Our approach to internal assessment for these qualifications will be broadly familiar to experienced centres. It offers flexibility in how and when you assess learners, provided that you meet assessment and quality assurance requirements. You will need to take account of the requirements of the unit format, explained in *Section 3*, and the requirements for delivering assessment.

In developing an overall plan for delivery and assessment for the programme you will need to consider the order in which you deliver units, whether delivery is over short or long periods and when assessment can take place.

Assessment through assignments

For internally-assessed units, the format of assessment is an assignment taken after the content of the unit or part of the unit, has been delivered. An assignment may take a variety of forms, including practical and written types and can be split into tasks. An assignment is a distinct activity completed independently by learners that is separate from teaching, practice, exploration and other activities that learners complete with direction from, and formative assessment by, tutors.

An assessment is issued to learners as an assignment brief with a defined start date, a completion date and clear requirements for the evidence that the learner needs to provide. There may be specific observed practical components during the assignment period. Assignments can be divided into tasks and may require several forms of evidence. A valid assignment will enable a clear and formal assessment outcome based on the assessment criteria.

Assessment decisions through applying unit-based criteria

Assessment decisions for BTEC Introductory qualifications are based on the specific criteria given in each unit and set at each grade level. To ensure that standards are consistent in the qualification and across the suite as a whole, the criteria for each unit have been defined according to a framework. The way in which individual units are written provides a balance of assessment of understanding, and sector- and transferable skills appropriate to the purpose of qualification.

The assessment criteria for a unit are hierarchical and holistic. For example, if a Merit criterion requires the learner to 'describe' and the related P criterion requires the learner to 'outline', then to satisfy the M criterion a learner will need to cover both 'outline' and 'describe'. The unit assessment grid shows the relationships of the criteria so that assessors can apply all the criteria to the learner's evidence at the same time. In *Appendix 1* we have set out a definition of terms that assessors need to understand.

Assessors must show how they have reached their decisions using the criteria in the assessment records. When a learner has completed all the assessment for a unit then the assessment team will give a grade for the unit. This is given according to the highest level for which the learner is judged to have met all the criteria. Therefore:

- to achieve a Distinction, a learner must have satisfied all the Distinction criteria (and therefore the Pass and Merit criteria); these define outstanding performance across the unit as a whole
- to achieve a Merit, a learner must have satisfied all the Merit criteria (and therefore the Pass criteria) through high performance in each learning aim
- to achieve a Pass, a learner must have satisfied all the Pass criteria for the learning aims, showing coverage of the unit content and therefore attainment at Level 1 of the national framework.

The award of a Pass is a defined level of performance and cannot be given solely on the basis of a learner completing assignments. Learners who do not satisfy the Pass criteria should be reported as having an Unclassified grade. See *Section 8* for further information on grading.

The assessment team

It is important that there is an effective team for internal assessment. There are three key roles involved in implementing assessment processes in your centre, each with different interrelated responsibilities, the roles are listed below. Full information is given in the *Pearson Quality Assurance Handbook*.

- The Lead Internal Verifier (the Lead IV) for the BTEC Introductory suite has overall responsibility for the programme across all sectors delivered in their centre. The Lead IV ensures the record keeping, assessment and internal verification meet our requirements and liaise with our Standards Verifier. The Lead IV registers with Pearson annually. The Lead IV acts as an assessor, supports the rest of the assessment team, makes sure that they have the information they need about our assessment requirements and organises training, making use of our guidance and support materials.
- Internal Verifiers (IVs) oversee all assessment activity in consultation with the Lead IV. They check that assignments and assessment decisions are valid and that they meet our requirements. IVs will be standardised by working with the Lead IV. Normally, IVs are also assessors but they do not verify their own assessments.
- Assessors set or use assignments to assess learners to national standards. Before taking any assessment decisions, assessors participate in standardisation activities led by the Lead IV. They work with the Lead IV and IVs to ensure that the assessment is planned and carried out in line with our requirements.

Effective organisation

Internal assessment needs to be well organised so that the progress of learners can be tracked and so that we can monitor that assessment is being carried out in line with national standards. It is particularly important that you manage the overall assignment programme and deadlines to make sure that learners are able to complete assignments on time.

Learner preparation

To ensure that you provide effective assessment for your learners, you need to make sure that they understand their responsibilities for assessment and the centre's arrangements.

From induction onwards, you will want to ensure that learners are motivated to work consistently and independently to achieve the requirements of the qualifications. Learners need to understand how assignments are used, the importance of meeting assignment deadlines, and that all the work submitted for assessment must be their own.

You will need to give learners a guide that explains how assignments are used for assessment, how assignments relate to the teaching programme, and how they should use and reference source materials, including what would constitute plagiarism. The guide should also set out your approach to operating assessment, such as how learners must submit work and request extensions.

Setting effective assignments

Setting assignments

In setting your assignments, you need to work with the guidance given in the *Essential information for tutors* section of a unit. This section gives you information on assessment decisions, with suggested scenarios for assessments. In designing your own assignment briefs you should bear in mind the following points.

- We recommend that you create a single assignment for the whole unit that incorporates skills and related content. This assignment may be broken into tasks.
- A learning aim must always be assessed as a whole and must not be split into two or more tasks.
- The assignment must be targeted to the learning aims but the learning aims and their associated criteria are not tasks in themselves. Criteria are expressed in terms of the outcome shown in the evidence.
- Assignments must be structured to allow learners to demonstrate the full range of achievement at all grade levels. Learners need to be treated fairly by being given the opportunity to achieve a higher grade if they have the ability.
- As assignments provide a final assessment, they will draw on the specified range of teaching content for the learning aims. The specified teaching content is compulsory. The evidence for assessment need not cover every aspect of the teaching content, as learners will normally be given particular examples, case studies or contexts in their assignments. For example, if a learner is carrying out one practical performance, or a visit to an organisation, then they will address all the relevant range of content that applies in that instance.

Providing an assignment brief

A good assignment brief is one that, through providing challenging and realistic tasks, motivates learners to provide appropriate evidence of their ability.

An assignment brief should have:

- a vocational scenario or context, this could be a simple situation or a full, detailed set of vocational requirements that motivates the learner to apply their learning through the assignment
- clear instructions to the learner about what they are required to do, normally that could be set out through a series of tasks
- an audience or purpose for which the evidence is being provided.

Forms of evidence

BTEC Introductory units allow for a variety of forms of evidence to be used, provided that they are suited to the type of learning aim and the learner being assessed. For most units, the practical demonstration of skills is necessary. The units give you information to suggest what would be suitable forms of evidence and to give learners the opportunity to apply a range of transferable and sector skills. Centres may choose to use different suitable forms for evidence to those proposed. Overall, learners should be assessed using varied forms of evidence.

Full definitions of types of assessment are given in *Appendix 1* but some of the main types of assessment are:

- oral or written presentations with assessor questioning
- practical assessments with observation records and supporting evidence
- recordings of role play, interviews and other activity
- work logbooks, reflective journals.

The form(s) of evidence selected must:

- allow the learner to provide all the evidence required for the learning aim(s) and the associated assessment criteria at all grade levels
- allow the learner to produce evidence that is their own independent work
- allow a verifier to independently reassess the learner to check the assessor's decisions.

For example, when you are using performance evidence, you need to consider how supporting evidence can be captured through recordings, photographs or task sheets.

Centres need to take particular care in ensuring that learners produce independent work.

Making valid assessment decisions

Authenticity of learner work

Once an assessment has begun, learners must not be given feedback on progress towards fulfilling the targeted criteria.

An assessor must assess only learner work that is authentic, i.e. learners' own independent work. Learners must authenticate the evidence that they provide for assessment through signing a declaration stating that it is their own work.

Assessors must ensure that evidence is authentic to a learner through setting valid assignments and supervising them during the assessment period. Assessors must take care not to provide direct input, instructions or specific feedback that may compromise authenticity.

Assessors must complete a declaration that:

- the evidence submitted for this assignment is the learner's own
- the learner has clearly referenced any sources used in the work
- they understand that false declaration is a form of malpractice.

Centres can use Pearson templates or their own templates to document authentication.

During assessment, an assessor may suspect that some or all of the evidence from a learner is not authentic. The assessor must then take appropriate action using the centre's policies for malpractice. Further information is given in *Section 7*.

Making assessment decisions using criteria

Assessors make judgements using the criteria. The evidence from a learner can be judged using all the relevant criteria at the same time. The assessor needs to make a judgement against each criterion that evidence is present and sufficiently comprehensive.

Assessors should use the following information and support in reaching assessment decisions:

- the explanation of key terms in *Appendix 1*
- your Lead IV and assessment team's collective experience, supported by the standardisation materials we provide.

Pass, Merit and Distinction criteria all relate to individual learning aims.

Dealing with late completion of assignments

Learners must have a clear understanding of the centre policy on completing assignments by the deadlines that you give them. Learners may be given authorised extensions for legitimate reasons, such as illness at the time of submission, in line with your centre policies.

For assessment to be fair, it is important that learners are all assessed in the same way and that some learners are not advantaged by having additional time or the opportunity to learn from others. Therefore, learners who do not complete assignments by your planned deadline or the authorised extension deadline may not have the opportunity to subsequently resubmit.

Issuing assessment decisions and feedback

Once the assessment team has completed the assessment process for an assignment, the outcome is a formal assessment decision. This is recorded formally and reported to learners.

The information given to the learner:

- must show the formal decision and how it has been reached, indicating how or where criteria have been met
- may show why attainment against criteria has not been demonstrated
- must not provide feedback on how to improve evidence.

Resubmission of improved evidence

An assignment provides the final assessment for the relevant learning aims and is normally a final assessment decision, except where the Lead IV approves one opportunity to resubmit improved evidence based on the completed assignment brief.

The Lead IV has the responsibility to make sure that resubmission is operated fairly. This means:

- checking that a learner can be reasonably expected to perform better through a second submission, having met the initial deadline. For example, that the learner has not performed as expected
- making sure that giving a further opportunity can be done in such a way that it does not give an unfair advantage over other learners, for example through the opportunity to take account of feedback given to other learners
- checking that the assessor considers that the learner will be able to provide improved evidence without further guidance and that the original evidence submitted remains valid.

Once an assessment decision has been given to the learner, the resubmission opportunity must have a deadline within 15 working days in the same academic year.

A resubmission opportunity must not be provided where learners:

- have not completed the assignment by the deadline without the centre's agreement or have submitted work that is not authentic.

A learner who has not achieved the level of performance required to pass the relevant learning aims after resubmission of an assignment may be offered a single retake opportunity using a new assignment. The retake may only be achieved at a pass.

The Lead Internal Verifier must only authorise a retake of an assignment in exceptional circumstances where they believe it is necessary, appropriate and fair to do so. For further information on offering a retake opportunity you should refer to the *BTEC Centre Guide to Assessment*. We provide information on writing assignments for retakes on our website (www.btec.co.uk/keydocuments).

Planning and record keeping

For internal processes to be effective, an assessment team needs to be well organised and keep effective records. The centre will work closely with us so that we can quality assure that national standards are being satisfied.

The Lead IV should have an assessment plan, produced as a spreadsheet. When producing their plan, the assessment team may wish to consider:

- the time available to undertake teaching and carry out assessment, taking account of when learners may complete external assessments and when quality assurance will take place
- the completion dates for different assignments
- who is acting as IV for each assignment and the date by which the assignment needs to be verified
- setting an approach to sampling assessor decisions through internal verification that covers all assignments, assessors and a range of learners
- how resubmission dates can be scheduled.

The Lead IV will also maintain records of assessment undertaken. The key records are:

- verification of assignment briefs
- learner authentication declarations
- assessor decisions on assignments, with feedback given to learners
- verification of assessment decisions.

Examples of records and further information are given in the *Pearson Quality Assurance Handbook*.

6 Administrative arrangements

Introduction

This section focuses on the administrative requirements for delivering a BTEC qualification. It is of particular value to Quality Nominees, Lead IVs, Programme Leaders and Examinations Officers.

Learner registration and entry

Shortly after learners start the programme of learning, you need to make sure that they are registered for the qualification and that appropriate arrangements are made for internal assessment. Refer to our *Information Manual* (available on our website) for information on making registrations for the qualification.

Learners can be formally assessed only for a qualification on which they are registered. If learners' intended qualifications change, for example if a learner decides to choose a qualification from a different sector, then you must transfer the learner appropriately.

Access to assessment

All assessments need to be administered carefully to ensure that all learners are treated fairly, and that results and certification are issued on time to allow learners to progress to chosen progression opportunities.

Our equality policy requires all learners to have equal opportunity to access our qualifications and assessments, and that our qualifications are awarded in a way that is fair to every learner. We are committed to making sure that:

- learners with a protected characteristic (as defined by the Equality Act 2010) are not, when they are undertaking one of our qualifications, disadvantaged in comparison to learners who do not share that characteristic
- all learners achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

Further information on access arrangements can be found in the Joint Council for Qualifications (JCQ) document *Access Arrangements, Reasonable Adjustments and Special Consideration for General and Vocational Qualifications*.

Administrative arrangements for internal assessment

Records

You are required to retain records of assessment for each learner. Records should include assessments taken, decisions reached and any adjustments or appeals. Further information can be found in our *Information Manual*. We may ask to audit your records so they must be retained as specified.

Reasonable adjustments to assessment

A reasonable adjustment is one that is made before a learner takes an assessment to ensure that they have fair access to demonstrate the requirements of the assessments. You are able to make adjustments to internal assessments to take account of the needs of individual learners. In most cases this can be achieved through a defined time extension or by adjusting the format of evidence. We can advise you if you are uncertain as to whether an adjustment is fair and reasonable. You need to plan for time to make adjustments if necessary.

Further details on how to make adjustments for learners with protected characteristics are given on our website in the document *Supplementary guidance for reasonable adjustment and special consideration in vocational internally assessed units*.

Special consideration

Special consideration is given after an assessment has taken place for learners who have been affected by adverse circumstances, such as illness. You must operate special consideration in line with our policy (see previous paragraph). You can provide special consideration related to the period of time given for evidence to be provided or for the format of the assessment if it is equally valid. You may not substitute alternative forms of evidence to that required in a unit, or omit the application of any assessment criteria to judge attainment. Pearson can consider applications for special consideration in line with the policy.

Appeals against assessment

Your centre must have a policy for dealing with appeals from learners. These appeals may relate to assessment decisions being incorrect or assessment not being conducted fairly. The first step in such a policy could be a consideration of the evidence by a Lead IV or other member of the programme team. The assessment plan should allow time for potential appeals after assessment decisions have been given to learners. If there is an appeal by a learner you must document the appeal and its resolution. Learners have a final right of appeal to Pearson but only if the procedures that you have put in place have not been followed. Further details are given in our policy *Enquiries and Appeals about Pearson Vocational Qualifications*.

Dealing with malpractice in assessment

Malpractice means acts that undermine the integrity and validity of assessment, the certification of qualifications, and/or that may damage the authority of those responsible for delivering the assessment and certification.

Pearson does not tolerate actions (or attempted actions) of malpractice by learners, centre staff or centres in connection with Pearson qualifications. Pearson may impose penalties and/or sanctions on learners, centre staff or centres where incidents (or attempted incidents) of malpractice have been proven.

Malpractice may arise or be suspected in relation to any unit or type of assessment within the qualification. For further details regarding malpractice and advice on preventing malpractice by learners please see *Centre Guidance: Dealing with Malpractice*, available on our website.

Note that the procedures we ask you to adopt vary between units that are internally assessed and those that are externally assessed. There is no external assessment in this qualification.

Internally-assessed units

Centres are required to take steps to prevent malpractice and to investigate instances of suspected malpractice. Learners must be given information that explains what malpractice is for internal assessment and how suspected incidents will be dealt with by the centre. The *Centre Guidance: Dealing with Malpractice* document gives full information on the actions we expect you to take.

Pearson may conduct investigations if we believe that a centre is failing to conduct internal assessment according to our policies. The above document gives further information, examples and details the penalties and sanctions that may be imposed.

In the interests of learners and centre staff, centres need to respond effectively and openly to all requests relating to an investigation into an incident of suspected malpractice.

Tutor/centre malpractice

Heads of Centres are required to inform Pearson's Investigations Team of any incident of suspected malpractice by centre staff, before any investigation is undertaken. Heads of Centres are requested to inform the Investigations Team by submitting a *JCQ Form M2(a)* with supporting documentation to pqsmalpractice@pearson.com. Where Pearson receives allegations of malpractice from other sources (for example Pearson staff or anonymous informants), the Investigations Team will conduct the investigation directly or may ask the head of centre to assist.

Incidents of maladministration (accidental errors in the delivery of Pearson qualifications that may affect the assessment of learners) should also be reported to the Investigations Team using the same method.

Heads of Centres/Principals/Chief Executive Officers or their nominees are required to inform learners and centre staff suspected of malpractice of their responsibilities and rights; see Section 6.15 of *JCQ Suspected Malpractice in Examinations and Assessments Policies and Procedures*.

Pearson reserves the right in cases of suspected malpractice to withhold the issuing of results and/or certificates while an investigation is in progress. Depending on the outcome of the investigation results and/or certificates may be released or withheld.

You should be aware that Pearson may need to suspend certification when undertaking investigations, audits and quality assurances processes. You will be notified within a reasonable period of time if this occurs.

Sanctions and appeals

Where malpractice is proven we may impose sanctions or penalties.

Where learner malpractice is evidenced, penalties may be imposed such as:

- disqualification from the qualification
- being barred from registration for Pearson qualifications for a period of time.

If we are concerned about your centre's quality procedures we may impose sanctions such as:

- working with you to create an improvement action plan
- requiring staff members to receive further training
- placing temporary blocks on your certificates
- placing temporary blocks on registration of learners
- debarring staff members or the centre from delivering Pearson qualifications
- suspending or withdrawing centre approval status.

The centre will be notified if any of these apply.

Pearson has established procedures for centres that are considering appeals against penalties and sanctions arising from malpractice. Appeals against a decision made by Pearson will normally be accepted only from Heads of Centres (on behalf of learners and/or members or staff) and from individual members (in respect of a decision taken against them personally). Further information on appeals can be found in our *Enquiries and Appeals* policy, on our website.

In the initial stage of any aspect of malpractice, please notify the Investigations Team by email via pqsmalpractice@pearson.com who will inform you of the next steps.

Certification and results

Once a learner has completed all the required components for a qualification, the centre can claim certification for the learner, provided that quality assurance has been successfully completed. For the relevant procedures please refer to our *Information Manual*. You can use the information provided on qualification grading to check overall qualification grades.

Results issue

Learner results will then be issued to centres. The result will be in the form of a grade. You should be prepared to discuss performance with learners, making use of the information we provide and post-results services.

Post-assessment services

It is possible to transfer or reopen registration in some circumstances. The *Information Manual* gives further information.

Additional documents to support centre administration

As an approved centre you must ensure that all staff delivering, assessing and administering the qualifications have access to this documentation. These documents are reviewed annually and are reissued if updates are required.

- *Pearson Quality Assurance Handbook*: this sets out how we will carry out quality assurance of standards and how you need to work with us to achieve successful outcomes.
- *Lead Verifier Reports*: these are produced annually and give feedback on the overall performance of learners.
- *Information Manual*: this gives procedures for registering learners for qualifications, transferring registrations, entering for external assessments and claiming certificates.
- *Regulatory policies*: our regulatory policies are integral to our approach and explain how we meet internal and regulatory requirements. We review the regulated policies annually to ensure that they remain fit for purpose. Policies related to this qualification include:
 - adjustments for candidates with disabilities and learning difficulties, access arrangements and reasonable adjustments for general and vocational qualifications
 - age of learners
 - centre guidance for dealing with malpractice
 - recognition of prior learning and process.

This list is not exhaustive and a full list of our regulatory policies can be found on our website.

7 Quality assurance and centre approval

Centre and qualification approval

As part of the approval process, your centre must make sure that the resource requirements listed below are in place before offering the qualification.

- Centres must have appropriate physical resources (for example, equipment, IT, learning materials, teaching rooms) to support the delivery and assessment of the qualification.
- Staff involved in the assessment process must have relevant expertise and/or occupational experience.
- There must be systems in place to ensure continuing professional development for staff delivering the qualification.
- Centres must have in place appropriate health and safety policies relating to the use of equipment by learners.
- Centres must deliver the qualification in accordance with current equality legislation.
- Centres should refer to the teacher guidance section in individual units to check for any specific resources required.

Continuing quality assurance and standards verification

We produce the *Pearson Quality Assurance Handbook* on an annual basis. It contains detailed guidance on the quality processes required to underpin robust assessment and internal verification.

The key principles of quality assurance are that:

- a centre delivering BTEC programmes must be an approved centre, and must have approval for the programmes or groups of programmes that it is delivering
- the centre agrees, as part of gaining approval, to abide by specific terms and conditions around the effective delivery and quality assurance of assessment; it must abide by these conditions throughout the period of delivery
- Pearson makes available to approved centres a range of materials and opportunities, through online standardisation, intended to exemplify the processes required for effective assessment, and examples of effective standards. Approved centres must use the materials and services to ensure that all staff delivering BTEC qualifications keep up to date with the guidance on assessment
- an approved centre must follow agreed protocols for standardisation of assessors and verifiers, for the planning, monitoring and recording of assessment processes, and for dealing with special circumstances, appeals and malpractice.

The approach of quality-assured assessment is through a partnership between an approved centre and Pearson. We will make sure that each centre follows best practice and employs appropriate technology to support quality-assurance processes, where practicable. We work to support centres and seek to make sure that our quality-assurance processes do not place undue bureaucratic processes on centres. We monitor and support centres in the effective operation of assessment and quality assurance.

The methods we use to do this for BTEC Introductory qualifications include:

- making sure that all centres complete appropriate declarations at the time of approval
- undertaking approval visits to centres
- making sure that centres have effective teams of assessors and verifiers who are trained to undertake assessment
- assessment sampling and verification, through requested samples of assessments, completed assessed learner work and associated documentation
- an overarching review and assessment of a centre's strategy for delivering and quality-assuring its BTEC programmes.

Centres that do not fully address and maintain rigorous approaches to delivering, assessing and quality assurance cannot seek certification for individual programmes or for any BTEC Introductory programmes. An approved centre must make certification claims only when authorised by us and strictly in accordance with requirements for reporting.

Centres that do not comply with remedial action plans may have their approval to deliver qualifications removed.

8 Understanding the qualification grade

This section explains the rules that we apply in providing an overall qualification grade for each learner. It shows how all the qualifications in this sector are graded.

The final grade awarded for a qualification represents a holistic performance across all of the qualification. As the qualification grade is an aggregate of the total performance, there is some element of compensation in that a higher performance in some units will be balanced by a lower outcome in others.

In the event that a learner achieves more than the required number units, the core units along with the sector units with the highest grades will be used to calculate the overall result, subject to the eligibility requirements for that particular qualification title.

Awarding and reporting for the qualification

The awarding and certification of these qualifications will comply with Ofqual requirements.

Eligibility for an award

To achieve any qualification grade, learners must:

- complete and report an outcome for all units within a valid combination (NB: Unclassified (U) is a permitted unit outcome), and
- achieve the minimum number of points at a grade threshold, and
- achieve sufficient Guided Learning Hours at Pass or above, see table below.

Qualification	Required Guided Learning Hours at Pass or above
Award	70
Certificate	140
Diploma	280

It is the responsibility of a centre to ensure that a correct unit combination is adhered to. Learners who do not achieve sufficient points for a Certificate or a Diploma may be eligible to achieve a smaller sized qualification in the same suite provided they have completed the correct combination of units, met the appropriate qualification grade points threshold and have met the requirement for guided learning a Pass or above.

Calculation of the qualification grade

The qualification grade is an aggregation of a learner's unit level performance. The BTEC Introductory suite comprises Level 1 qualifications which are awarded at the grade ranges shown in the table below.

Qualification	Available grade range
Award	P to D
Certificate	P to D
Diploma	PP to DD

The *Calculation of Qualification Grade* table, shown further on in this section, indicates the minimum thresholds for calculating these grades. The table will be kept under review over the lifetime of the qualification. In the event of any change, centres will be informed before the start of teaching for the relevant cohort and an updated table will be issued on our website.

Pearson will monitor the qualification standard and reserves the right to make appropriate adjustments.

Learners who do not meet the minimum requirements for a qualification grade to be awarded will be recorded as Unclassified (U) and will not be certificated. They may receive a Notification of Performance for individual units. Our *Information Manual* gives full information of this process.

Points available for internal units

The table below shows the number of **points** available for units. For each unit, points are allocated depending on the grade awarded.

	Unit size	
	30 GLH	40 GLH
U	0	0
Pass	6	8
Merit	12	16
Distinction	18	24

Claiming the qualification grade

Subject to eligibility, Pearson will automatically calculate the qualification grade for your learners when the internal unit grades are submitted and the qualification claim is made. Learners will be awarded qualification grades for achieving the sufficient number of points within the ranges shown in the relevant *Calculation of Qualification Grade* table for the cohort.

Calculation of qualification grade

Applicable for registration from 1 September 2019.

Award		Certificate		Diploma	
70 GLH		180 GLH		360 GLH	
Grade	Points threshold	Grade	Points threshold	Grade	Points threshold
U	0	U	0	U	0
P	14	P	36	PP	72
				MP	96
M	22	M	60	MM	120
				DM	158
D	36	D	96	DD	196

The table is subject to review over the lifetime of the qualification. The most up-to-date version will be issued on our website.

Examples of grade calculations based on table applicable to registrations from September 2019

Example 1: Achievement of an Award with a D grade

	GL	Grade	Unit points
Unit 1	30	Distinction	18
Unit 7	40	Distinction	24
Totals	70	D	36

The learner has sufficient points for a D grade

Example 2: Achievement of an Award with a P grade

	GL	Grade	Unit points
Unit 1	30	Pass	6
Unit 7	40	Pass	8
Totals	70	P	14

The learner has sufficient points for a P grade

The learner has met the minimum requirement for 70 GL at Pass or above

Example 3: An Award graded unclassified

	GL	Grade	Unit points
Unit 1	30	U	0
Unit 7	40	Distinction	24
Totals	70	P	24

The learner has a U in Unit 1

The learner has sufficient points for a M but has not met the minimum requirement for 70 GL

Example 4: Achievement of a Certificate with a D grade

	GL	Grade	Unit points
Unit 1	30	Distinction	18
Unit 2	30	Pass	6
Unit 5	40	Distinction	24
Unit 6	40	Distinction	24
Unit 7	40	Distinction	24
Totals	180	D	96

The learner has sufficient points for a D grade

Example 5: Achievement of a Certificate with a P grade

	GL	Grade	Unit points
Unit 1	30	U	0
Unit 2	30	Merit	12
Unit 5	40	Pass	8
Unit 6	40	Pass	8
Unit 7	40	Pass	8
Totals	180	P	36

The learner has met the minimum requirement for 140 GL at Pass or above

The learner has sufficient points for a P grade

Example 6: A Certificate graded Unclassified

	GL	Grade	Unit points
Unit 1	30	U	0
Unit 2	30	Distinction	18
Unit 5	40	Distinction	16
Unit 6	40	U	0
Unit 7	40	Pass	8
Totals	180	U	42

The learner has a U in Units 1 and 6

The learner has sufficient points for M but has not met the minimum requirement for 140 GL at Pass or above

Example 7: A Diploma graded Unclassified

	GL	Grade	Unit points
Unit 1	30	U	0
Unit 2	30	Distinction	18
Unit 3	30	Pass	6
Unit 4	30	Pass	6
Unit 5	40	Pass	8
Unit 6	40	U	0
Unit 7	40	U	0
Unit 8	40	Distinction	24
Unit 9	40	Distinction	24
Unit 10	40	Distinction	24
Totals	360	U	110

The learner has not met the minimum requirement for 280 GL at Pass or above

The learner has sufficient points for MP but has not met the minimum requirement for 280 GL at Pass or above

Example 8: Achievement of a Diploma with a DD grade

	GL	Grade	Unit points
Unit 1	30	Merit	12
Unit 2	30	Merit	12
Unit 3	30	Distinction	18
Unit 4	30	Distinction	18
Unit 5	40	Distinction	24
Unit 6	40	Distinction	24
Unit 7	40	Distinction	24
Unit 8	40	Distinction	24
Unit 9	40	Distinction	24
Unit 10	40	Merit	16
Totals	360	DD	196

The learner has sufficient points for a DD grade

Example 9: Achievement of a Diploma with a PP grade

	GL	Grade	Unit points	
Unit 1	30	U	0	<p>The learner has met the minimum requirement for 280 GL at Pass or above</p>
Unit 2	30	Merit	12	
Unit 3	30	Pass	6	
Unit 4	30	Pass	6	
Unit 5	40	U	0	
Unit 6	40	Pass	8	
Unit 7	40	Pass	8	
Unit 8	40	Pass	8	
Unit 9	40	Merit	16	
Unit 10	40	Pass	8	
Totals	360	PP	72	<p>The learner has sufficient points for a PP grade</p>

9 Resources and support

Our aim is to give you support to enable you to deliver BTEC Introductory qualifications with confidence. You will find resources to support teaching and learning, and professional development on our website.

Support for setting up your course and preparing to teach

Delivery Guide

The free guide gives you important advice on how to choose the right course for your learners and how to ensure you are fully prepared to deliver the course. It explains the key features of BTEC Introductory qualifications (for example how to deliver and assess transferable and sector skills). It covers guidance on assessment and quality assurance and includes teaching tips and ideas, assessment preparation and suggestions for further resources.

Support for teaching and learning

Pearson Learning Services provides a range of engaging resources to support BTEC qualifications, including:

- textbooks in e-book and print formats
- teaching and assessment packs, including e-learning materials via the Active Learn Digital Service.

Teaching and learning resources are also available from a number of other publishers. Details of Pearson's own resources and of all endorsed resources can be found on our website.

Support for assessment

Sample assessment materials for internally-assessed units

We do not prescribe the assessments for the internally-assessed units. Rather, we allow you to set your own, according to your learners' preferences.

Training and support from Pearson

People to talk to

There are lots of people who can support you and give you advice and guidance on delivering your BTEC Introductory qualifications. They include:

- Standards Verifiers – they can support you with preparing your assignments, ensuring that your assessment plan is set up correctly, and support you in preparing learner work and providing quality assurance through sampling
- Subject Advisors – available for all sectors. They understand all Pearson qualifications in their sector and so can answer sector-specific queries on planning, teaching, learning and assessment
- Curriculum Development Managers (CDMs) – they are regionally based and have a full overview of the BTEC qualifications and of the support and resources that Pearson provides. CDMs often run network events
- Customer Services – the 'Support for You' section of our website gives the different ways in which you can contact us for general queries. For specific queries, our service operators can direct you to the relevant person or department.

Training and professional development

We provide a range of training and professional development events to support the introduction, delivery, assessment and administration of BTEC Introductory qualifications. These sector-specific events, developed and delivered by specialists, are available both face to face and online.

Appendix 1 Glossary of terms used for internally-assessed units

This is a summary of the key terms used to define the requirements in the units.

Term	Definition
Accurate	Perform processes and procedures without error.
Coherent	Logically consistent.
Collaborate	Work jointly with others.
Competent	Having the necessary knowledge or skill to do something suitably or sufficiently in amount or extent.
Comprehensive	Full, covering a range of factors.
Confident	Demonstrate secure application of skills or processes.
Consistent	Able to reliably repeat an action that progresses towards achieving an aim.
Creative	Use techniques, equipment and processes to express ideas or feelings in new ways.
Demonstrate	Carry out and apply knowledge, understanding and/or skills in a practical situation.
Describe	Give a clear account that includes all the relevant features and characteristics – ‘painting a picture with words’.
Effective	Show control over techniques, equipment and processes to efficiently meet the details and broad aims of a requirement.
Explain	Work shows clear details and gives reasons and/or evidence to support an opinion, view or argument. Learners can show comprehension of origins, functions and objectives of a subject and its suitability for purpose.
Identify	Indicate the main features or purpose of something by recognising it and/or being able to discern and understand facts or qualities.
Insightful	Being perceptive and discerning.
Outline	Learners’ work, performance or practice provides a summary or overview or a brief description.
Reflect	Think carefully and review information and/or performance – includes articulating ideas, concepts, activities, findings or features.
Review	Assess formally, appraising existing information or prior events with the intention of instituting change if necessary.

Term	Definition
Show	Learners' work, performance or practice presents evidence using knowledge, understanding and skills.
State	Learners express the condition of, or facts about something definitely or clearly.
Summarise	Learners express the condition of, or facts about something definitely or clearly.

This is a key summary of the types of evidence used for BTEC Introductory Suite of qualifications.

Type of evidence	Definition and purpose
Vocational context	A specific example to which all learners must select and apply knowledge. Used to show application to a realistic context where direct experience cannot be gained.
Development log	A record kept by learners to show the process of development. Used to show method, self-management and skill development.
Performance	A defined and constrained opportunity to perform, to show skills in a structured context and where the focus is on the skills/process rather than the specific outcome.

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