Rewarding Learning

CCEA Level 1 and 2 Qualifications in Occupational Studies

For first teaching from September 2013

For first assessment from Summer 2014
For first award in Summer 2014

occupational studies

engineering and engineering services

Foreword

This publication contains the specification for CCEA's Level 1 and Level 2 qualifications in Occupational Studies for first teaching from September 2013. We have designed these qualifications to meet the requirements of the following:

- the National Qualifications Framework (NQF) at Level 1 and Level 2; and
- Common Criteria for all Qualifications.

The following grades are available:

NQF	Occupational Studies Grades
Level 2	Distinction* Distinction Merit Pass
Level 1	Distinction Merit Pass
	Unclassified

For more information on the NQF, see www.ofqual.gov.uk

The specification for Occupational Studies consists of six occupational areas and their associated units:

- Business and Services;
- Construction;
- Design and Creativity;
- Engineering and Engineering Services;
- Environment and Society; and
- Technology and Innovation.

To achieve a qualification, learners must take two units from an occupational area. It is possible to obtain up to six Occupational Studies qualifications, one in each area. Each qualification enables learners to demonstrate their knowledge, understanding and skills within a context related to employability.

Each of the qualifications consists of 140 guided learning hours.

We will notify centres in writing of any major changes to this specification. We will also publish changes on our website at www.ccea.org.uk

The specification on our website is the most up-to-date version. Please note that the web version may be different from printed versions.

	QAN
Level 1/2 (Business and Services)	600/8774/2
Level 1/2 (Construction)	600/8652/X
Level 1/2 (Design and Creativity)	600/8186/7
Level 1/2 (Engineering and Engineering Services)	600/8655/5
Level 1/2 (Environment and Society)	600/8653/1
Level 1/2 (Technology and Innovation)	600/8775/4

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Foreword

A Introduction

This specification sets out the content and assessment details for our Level 1 and Level 2 qualifications in Occupational Studies. First teaching begins from September 2013, and we will make the first awards for this specification in summer 2014. You can view and download the latest version of the specification on our website at www.ccea.org.uk

We have designed this specification to be accessible to a wide range of learners of all abilities. It is also intended to provide coherent, flexible programmes rooted in practical and occupational contexts. Occupational Studies will appeal to learners who are better suited to developing their skills in a more practical, occupationally orientated environment.

The world of work is constantly changing. It is increasingly unlikely that a single occupation will take employees from the beginning to the end of their working lives, so transferability and adaptability are important skills. This specification is uniquely structured with this in mind. Learners have the opportunity to learn for work, through work and about work, with real outcomes that will give them skills for life.

Occupational Studies can provide a hands-on approach to learning. What makes it different is its focus on particular kinds of knowledge, understanding and skills, providing the potential for learning in important 'out-of-school' contexts.

Centres should ensure that learners will have access to any tools, equipment and materials they will need to complete the practical tasks. In offering and designing courses to support this qualification, they need to take account of the facilities and resources they have available, as well as the career planning decisions of their learners.

It is neither expected nor intended that pupils should become competent or trained in the occupational area they are studying. Competence-based training programmes are available post-16 and can offer suitable progression opportunities.

A.1 Aims and learning outcomes

Occupational Studies encourages learners to be motivated and inspired by following a broad, coherent and satisfying course of study. It gives them opportunities to sample work-related learning within coherent occupational contexts and to develop their skills in literacy, numeracy and ICT. It should also prepare learners to make informed decisions about further learning opportunities and careers.

Occupational Studies should enable learners to:

- develop the knowledge, understanding and skills they need to undertake work-based tasks;
- engage actively in work-based learning within coherent occupational contexts;
- reflect on their learning;
- develop an appreciation of the progression/career opportunities that exist through the study of Occupational Studies;
- develop an appreciation of the environmental impacts of the practical tasks they carry out within occupational contexts; and
- develop an awareness of general and specific health and safety issues arising from activities within occupational contexts.

A.2 Key features

The Occupational Studies specification:

- has an occupational and employability focus;
- enables progression to other courses, training and employment;
- helps to raise levels of achievement, since learners are likely to be more motivated to achieve success through applying their knowledge in practical, work-related situations and contexts; and
- emphasises learning by doing, which will help learners to develop the transferable skills necessary in a changing and dynamic working environment.

We have devised this specification in consultation with Sector Skills Councils, teachers in schools, teachers/lecturers in further and higher education colleges, and employers.

Learners and providers can, therefore, be confident that the specification is up to date and reflects sector priorities.

A.3 Prior attainment and progression

Learners taking a course in Occupational Studies do not need to have any previous experience in their chosen occupational area.

Occupational Studies allows progression from Key Stage 3 of the Northern Ireland Curriculum. Learners achieving a Level 2 qualification in Occupational Studies will be equipped to progress to courses at post-16 in the relevant subject areas.

A.4 Permitted unit combinations and entries

Within Occupational Studies there are six individual qualifications. Each of these relates to a general occupational area and includes a range of optional units (see Section 2 for details). To achieve a qualification, learners must complete two units from the same occupational area. The qualification will include the title from the relevant area, for example: Occupational Studies: Technology and Innovation Level 2 Pass.

Some units, shown in the table in Section 2 in bold type, are available within more than one occupational area. This flexibility is to allow learners greater choice.

However, learners cannot submit any unit towards a qualification more than once. They may not resit a unit unless they were recorded as absent the first time the unit was taken.

Learners may not enter for the same qualification more than once. Those who achieved a qualification based on a previous version of the Occupational Studies specification cannot take another qualification in the same occupational area.

B Specification at a Glance

The table below summarises the structure of each of the six Occupational Studies qualifications.

Occupational Area	Assessment	Weighting	Availability
Business and Services (15 units available)	Internal assessment. Learners complete two units from their chosen occupational area. They carry out tasks to gather the required assessment evidence in a portfolio for each unit. Tasks include answering questions, carrying out practical activities and evaluating their own performance. The teacher/lecturer assesses the portfolio of evidence, and we carry out external moderation.	50% for each unit	Every January (beginning in 2015) Every Summer (beginning in 2014)
Construction (8 units available)			
Design and Creativity (12 units available)			
Engineering and Engineering Services (11 units available)			
Environment and Society (9 units available)			
Technology and Innovation (9 units available)			

Please check online for the most up-to-date list and versions of units. Units in bold type are available in two different occupational areas.

Business and Services	Construction	Design and Creativity	Engineering and Engineering Services	Environment and Society	Technology and Innovation
Childcare: the Play Environment Communication in an Office or Business Environment **Contemporary Cuisine** **Creative Styling Using Blow-Drying Techniques** Customer Service Facial Skincare Logistics and Transport Manicure and Nail Art Modern Office Procedures Modern Retailing **Patisserie and Baking** Shampooing and Conditioning Treatments The Physical Care of Babies Using Office Technology **Vehicle Servicing and Valeting Operations**	**Bench Joinery** Brick and Block Work **Carpentry and Joinery** Hard Landscaping Painting and Decorating Plastering **Plumbing** Tiling	**Contemporary Cuisine** Creative Hair Styling on Long Hair Creative Hair Styling Setting Techniques **Creative Styling Using Blow-Drying Techniques** Enterprise Crafts Graphic Design Interior Design **Patisserie and Baking** Specialised Crafts Textile and Fashion Design Total Beauty Website Development	Basic Fast-Fit Operations Basic Vehicle Body Components and Fitting **Computer Aided Design** Electronic Circuit Construction Electrical Wiring Installation Maintenance of Land-Based Machinery **Manufacturing Techniques – Hand Fitting** **Manufacturing Techniques – Sheet Metal** **Plumbing** **Vehicle Servicing and Valeting Operations** Vehicle Technician Operations	Animal Care Horticulture: Caring for Plants and Flowers Horticulture: Growing Plants in a Sustainable Way Reminiscence with Individuals in a Care Environment Running a Leisure Event Sports Leadership Tour Guiding Working in a Care Environment Working in Tourism	**Bench Joinery** **Carpentry and Joinery** **Computer Aided Design** Digital Imaging Digital Music **Manufacturing Techniques – Hand Fitting** **Manufacturing Techniques – Sheet Metal** Sound Production TV and Film Production
15 units	**8 units**	**12 units**	**11 units**	**9 units**	**9 units**

C Scheme of Assessment

C.1 Assessment opportunities

This specification is available for assessment twice a year, in January and summer. See Section 2 for more details.

C.2 Assessment objectives

Below are the assessment objectives for this specification. Learners must:

- recall knowledge and understanding of the specified content (AO1);
- apply their knowledge, understanding and skills in occupational contexts through undertaking relevant tasks (AO2); and
- analyse and evaluate their work and make judgements about their performance, indicating where improvements could be made (AO3).

In the unit content you will find separate assessment criteria for each assessment objective in individual units. We have provided descriptors relating to the various levels of achievement for each of the assessment criteria.

C.3 Assessment objective weightings

The table below sets out the assessment objective weightings for each unit.

Assessment Objective	Weighting in Each Unit
AO1	20%
AO2	60%
AO3	20%

Each qualification consists of two units. Each unit is equally weighted and is worth 50 percent of the overall qualification.

The table below sets out the assessment objective weighting for the overall qualification:

Assessment Objective	Unit Weighting		Overall Qualification Weighting
	First Unit	Second Unit	
AO1	10%	10%	20%
AO2	30%	30%	60%
AO3	10%	10%	20%
Total	50%	50%	100%

C.4 Reporting and grading

Unit results

Learner performance in a unit is reported as a mark out of 100.

Overall qualification results

We award Occupational Studies qualifications at either Level 1 or Level 2 on the National Qualifications Framework. Where performance is below the requirements for Level 1, we report the results as unclassified (U).

To achieve a full qualification, learners must complete two units. We will award a final grade based on the combined scores of the two units as follows:

Level 2	Level 1
Distinction* = 180–200 marks Distinction = 160–179 marks Merit = 140–159 marks Pass = 120–139 marks	Distinction = 100–119 marks Merit = 80–99 marks Pass = 40–79 marks
Unclassified = 0–39 marks	

D Performance Descriptors

Within each unit, there are detailed performance descriptors relating to the specific skills and knowledge required (see unit content). Teachers/Lecturers should use these when allocating marks. They should also refer to the following table, which helps to define the performance descriptors.

Examples of learner evidence will be available at agreement trials and on the CCEA microsite for Occupational Studies at www.ccea.org.uk

Performance Descriptor	Explanation
Excellent	In relation to the occupational area and where appropriate, learners can: • recall, select and communicate detailed knowledge and thorough understanding of the relevant skills and materials; • demonstrate comprehensive understanding of relevant health and safety and environmental issues; • demonstrate in-depth knowledge of related career opportunities; • demonstrate highly developed skills confidently when planning and identifying all appropriate tools, equipment and materials for a task; • carry out tasks consistently with a high degree of precision and sustained application of the required health and safety legislation and practices; • work with a high level of independence to produce a final outcome which is of a professional standard; • present thorough analysis and evaluation of their own performance in practical tasks, making fully developed and reasoned judgements; and • present highly appropriate and self-reflective statements about the learning process in the unit.
Very good	In relation to the occupational area and where appropriate, learners can: • recall, select and communicate accurate knowledge and detailed understanding of the relevant skills and materials; • demonstrate detailed understanding of relevant health and safety and environmental issues; • demonstrate well developed knowledge of related career opportunities; • demonstrate effective skills when planning and identifying all appropriate tools, equipment and materials for a task; • carry out tasks accurately with a significant degree of precision and suitable application of the required health and safety legislation and practices; • work, often independently, to produce a final outcome which is of a high standard; • present a well-developed analysis and evaluation of their own performance in practical tasks, making sound judgements; and • present detailed, self-reflective statements about the learning process in the unit.

Performance Descriptor	Explanation
Good	In relation to the occupational area and where appropriate, learners can: • recall, select and communicate clear knowledge and understanding of the relevant skills and materials; • demonstrate consistent and clear understanding of relevant health and safety and environmental issues; • demonstrate significant knowledge of related career opportunities; • demonstrate a range of appropriate skills when planning and identifying all appropriate tools, equipment and materials for a task; • carry out tasks effectively, with some precision and suitable application of the required health and safety legislation and practices; • work, sometimes independently, to produce a final outcome which is of a suitable standard; • present clear and effective analysis and evaluation of their own performance in practical tasks, making realistic judgements; and • present straightforward, self-reflective statements about the learning process in the unit.
Satisfactory	In relation to the occupational area and where appropriate, learners can: • recall, select and communicate some appropriate knowledge and understanding of the relevant skills and materials; • demonstrate satisfactory understanding of relevant health and safety and environmental issues; • demonstrate relevant knowledge of related career opportunities; • demonstrate some appropriate skills when planning and identifying all appropriate tools, equipment and materials for a task; • carry out tasks appropriately, with acceptable application of the required health and safety legislation and practices; • work, often with support, to produce a final outcome which is of an acceptable standard; • present some relevant analysis and evaluation of their own performance in practical tasks, making some appropriate judgements; and • present some appropriate self-reflective statements about the learning process in the unit.
Basic	In relation to the occupational area and where appropriate, learners can: • recall, select and communicate limited knowledge and understanding of minimal skills and materials; • demonstrate limited understanding of relevant health and safety and environmental issues; • demonstrate minimal knowledge of related career opportunities; • demonstrate limited skills to plan and identify all appropriate tools, equipment and materials for a task; • carry out tasks with a limited degree of accuracy and do not always apply the required health and safety legislation and practices;; • work, mostly with support, to produce a final outcome which is either incomplete or of a limited standard; • present minimal analysis and evaluation of their own performance in practical tasks; and • present limited self-reflective statements about the learning process in the unit.
• **Award [0] for work unworthy of credit.**	

E Guidance on Assessment

E.1 The portfolio of evidence

Teachers/Lecturers should plan practical occupational tasks to collect evidence of learning for each unit. These tasks must give learners opportunities to demonstrate the knowledge, understanding and skills described in the unit content (see Section 7). For each unit, learners must present their evidence for assessment in a portfolio.

The portfolio of evidence for each unit **must** contain the following:

- **Evidence of knowledge and understanding (AO1)**
  This may take the form of written answers to questions or, where more appropriate, a record of oral responses to questions. It must cover the range of knowledge and understanding set out in the unit content.
- **Evidence of application of knowledge, understanding and skills (AO2)**
  Teachers/Lecturers must assess all activities to occupational standards by observing learners' performance in practical tasks.
- **Evidence of analysis and evaluation of their work (AO3)**
  Learners should carry out an evaluation for each assessment task within each unit. It should consist of self-reflective statements that analyse and evaluate their performance and indicate how they could make improvements. They should also present an end-of-unit evaluation. This should reflect their new level of knowledge and understanding in the specialist area and the impact it may have on their progression and career opportunities.
- **A diary of activities undertaken**
  The diary must be signed and dated during each lesson by the learner and teacher/lecturer and record all activities the learner has carried out as part of the unit.
- **A record of all the assessment evidence**
  The record indicates where each piece of assessment evidence can be found.

Evidence in learners' portfolios may be written, photographic or video recorded. Where the evidence includes photographs or videos, centres should obtain permission from parents/guardians first.

Centres should label the evidence and store it securely so that they can make it available for moderators to review later.

We will provide centres with candidate record sheets, which teachers/lecturers must use to record learners' overall marks for each unit.

See unit content for specific assessment guidance for each unit.

E.2 Stretch and challenge

Teachers/Lecturers should identify opportunities for stretch and challenge by incorporating, for example:

- a wider range of question types to address different skills, for example case studies and open-ended questions;
- practical tasks that are more challenging; and
- extended writing within evaluations, where appropriate.

E.3 Internal standardisation

Where more than one teacher/lecturer has been involved in marking for a qualification, there must be a process of internal standardisation to ensure that there is consistent application of the marking criteria.

As a result of internal standardisation, it may be necessary to adjust the marking of an individual teacher/lecturer. This is to bring assessments into line with others in the centre and to match the standards established at the agreement trial. Where adjustment is necessary, the total/final mark recorded on the candidate record sheet should be amended.

Teachers/Lecturers must use the TAC2 form available at www.ccea.org.uk to show that internal standardisation has taken place both within **and** across units.

If your centre is part of a consortium, it will be the lead centre's responsibility to ensure that the internal standardisation process includes all teachers/lecturers from all centres involved in the consortium.

E.4 External moderation

Marks awarded by the centre will be subject to external moderation, which we carry out. We issue full instructions before moderation takes place in January and May each year on:

- the details of moderation procedures;
- the nature of sampling; and
- the dates by which marks and samples have to be submitted to us.

Centres should keep all assessment materials and related documentation for 12 months after they submit marks, as this work may form part of an enquiry or appeal.

F Links, Resources and Support

F.1 Support

We provide the following resources to support this specification:

- our website at www.ccea.org.uk; and
- a subject microsite for Occupational Studies within our website.

We are expanding our range of support to include the following:

- Principal Moderator's reports;
- exemplar pieces of work;
- templates for learner diaries and records;
- agreement trials;
- a resource list;
- exemplification of standards; and
- centre support visits.

F.2 Curriculum objectives

The specification addresses and builds upon the broad objectives of the Northern Ireland Curriculum. In particular, it enables learners to:

- develop as individuals and contributors to society, the economy and the environment, by providing opportunities to explore topics such as health, media awareness and work in the local and global economy;
- develop personal skills, such as:
  - self-awareness, active listening, and time management (Personal Development);
  - mutual understanding, managing conflict, and participation (Citizenship);
  - presentation and self-marketing, target setting, and career planning (Employability);
- develop an understanding of social, economic and cultural issues, by providing opportunities to explore topics such as health and safety legislation, recycling of materials, the use of sustainable and environmentally friendly materials, the disposal of waste materials, and costing and resourcing of materials;
- develop vocational skills that will enhance employability, by providing opportunities to select and use appropriate materials, components and hand tools, and to gain an overview of the roles and responsibilities of various occupations;
- make effective use of technology, for example by providing opportunities to create computer aided drawings and source information through the internet; and
- demonstrate creativity and initiative when developing ideas and following them through.

F.3 Key skills

Occupational Studies provides learners with opportunities to develop and generate assessment evidence for the following nationally recognised key skills:

- **Application of Number** – for example by:
  - interpreting information from two different sources;
  - using information to carry out calculations; and
  - interpreting the results of calculations and presenting findings in at least two different ways;
- **Communication** – for example by:
  - taking part in a group discussion;
  - reading and summarising information from at least two documents;
  - giving a talk of at least four minutes; and
  - writing two types of document, each giving different information;
- **Information and Communication Technology** – for example by:
  - finding and selecting information based on judgements of relevance and quality;
  - entering and bringing together information using formats that help development; and
  - developing a presentation so that it is accurate, clear and presented consistently;
- **Working with Others** – for example by:
  - identifying what needs to be achieved together as a group;
  - showing confirmation of the arrangements made for working together; and
  - showing how progress was checked and advice sought from an appropriate person when needed;
- **Problem Solving** – for example by:
  - identifying a problem and accurately describing its main features;
  - planning what needs to be done and identifying which methods and resources to use; and
  - showing that they have successfully solved the problem using the methods given; and
- **Improving Own Learning and Performance** – for example by:
  - providing information to help set realistic targets for what is to be achieved;
  - identifying how to get the support needed and the arrangements for reviewing progress; and
  - identifying what has been learned and how this learning has been used in another task.

F.4 Entries and registration

Entry codes for this subject and details on how to register are available in our Qualifications Administration Handbook, which you can access at www.ccea.org.uk

Alternatively, you can telephone our Entries, Results and Certification team using the contact details provided in this section.

F.5 Equality and inclusion

We have considered the requirements of equality legislation in developing this specification.

These qualifications require the assessment of a broad range of knowledge, understanding and skills. This is because they prepare learners for a wide range of occupations and higher level courses.

During the development process, an external equality panel reviewed the specification to identify any potential barriers to equality and inclusion. Where appropriate, we have considered measures to support access and mitigate barriers.

Reasonable adjustments are made for learners with disabilities. For this reason very few learners, if any, should have difficulty accessing the assessment.

It is important to note that where access arrangements are permitted, they must not be used in any way that undermines the integrity of the assessment. You can find information on reasonable adjustments in the Joint Council for Qualifications' document Access Arrangements, Reasonable Adjustments and Special Consideration: General and Vocational Qualifications, available at www.jcq.org.uk

F.6 Health and safety

As with all work-related programmes, centres must ensure compliance with all relevant health and safety legislation with regard to facilities, equipment and staff training, as well as current legislation under the Children (Northern Ireland) Order 1995. Schools' level of insurance and available resources may restrict the choice of units that they are able to offer.

Please note that learners under the age of 16 are not permitted to work with external clients in hairdressing and beauty units, nor are they permitted to work with children. Teachers/Lecturers must supervise learners when they are using specialist tools, equipment and materials.

F.7 Contact details

The following list provides contact details for relevant staff members and departments:

- Specification Support Officer: Nuala Braniff
  (telephone: (028) 9026 1200, extension 2292, email: nbraniff@ccea.org.uk)

- Officer with Subject Responsibility: Dawn Agnew
  (telephone: (028) 9026 1200, email: dagnew@ccea.org.uk)

- Entries, Results and Certification
  (telephone: (028) 9026 1262, email: entriesandresults@ccea.org.uk)

- Distribution (support materials)
  (telephone: (028) 9026 1242, email: cceadistribution@ccea.org.uk)

- Support Events Administration
  (telephone: (028) 9026 1401, email: events@ccea.org.uk)

- Information Section (including Freedom of Information requests)
  (telephone: (028) 9026 1200, email: info@ccea.org.uk)

- Moderation
  (telephone: (028) 9026 1200, extension 2236, email: aatmoderation@ccea.org.uk)

Appendix 1

Glossary of terms

Term	Definition
Centres	Centres are organisations accountable to an awarding body (such as CCEA) for the organisation of assessment arrangements leading to a unit or qualification.
Essential Skills	Nationally accredited adult qualifications available throughout Northern Ireland in Entry Level Literacy, Entry Level Numeracy, Level 1 and 2 Communication, and Level 1 and 2 Application of Number. Essential Skills are designed to help individuals improve their performance in a variety of contexts.
External moderators	External moderators are appointed, trained and monitored by CCEA and are responsible for monitoring and sampling learners' evidence to ensure that internal assessment decisions are valid, reliable, fair and consistent with national standards.
Internal assessment	The process by which teachers/lecturers in a centre assess learners' achievement of the learning outcomes of the unit(s) making up a qualification.
Internal standardisation	Where more than one teacher/lecturer has been involved in marking units in an occupational area (for example Business and Services), the centre must review samples assessed by each marker within and across units to ensure that they have applied the performance descriptors consistently to learners' work and make adjustments to marks if necessary.
Key Skills	Key Skills underpin our ability to carry out successfully a wide range of tasks in education, employment and whenever and wherever we continue to learn. The six Key Skills are Communication, Application of Number, Information and Communication Technology, Working with Others, Improving Own Learning and Performance, and Problem Solving. All CCEA qualifications provide opportunities for generating evidence towards achievement of some, or all, of the Key Skills.

Term	Definition
National Occupational Standards	These set out what a person needs to know, understand and do in relation to identified skills and competences required for the relevant industrial sector. They form the basis of National Vocational Qualifications (NVQs) and vocationally-related qualifications.
National Qualifications Framework (NQF)	A framework of levels and categories of qualifications, which have been accredited by the Regulatory Authorities and which enable recognition of achievement and facilitate career progression.
Qualifications Administration Handbook	An online document produced by CCEA that contains all the information a centre requires regarding the procedures and policies necessary for the smooth administration of CCEA's qualifications.
Register of Regulated Qualifications	An online database of units and qualifications that have been accredited by the Regulatory Authorities.
Unit/Learning Outcome	Each qualification is made up of a number of units. Each unit consists of a number of sections which outline its learning outcomes. Learning outcomes consist of the knowledge, skills and understanding a learner must successfully demonstrate and evaluate in order to achieve the qualification.

Basic Fast-Fit Operations

UNIT 36

This unit introduces learners to basic fast-fit operations and components found in modern fast-fit garages and motor vehicles today.

Learners will also gain knowledge and understanding of health and safety in the workplace and other skills associated with working in a garage.

The physical resources needed to support the delivery and assessment of this unit should be of industry standard. Teachers/Lecturers delivering the programme and conducting the assessment should be fully familiar with current practice and standards in the sector.

This unit includes:

- consideration of health and safety issues in the motor vehicle industry;
- consideration of environmental regulations and issues in the motor vehicle industry;
- consideration of career opportunities in the motor vehicle industry;
- safe use of basic fast-fit components, tools and equipment; and
- a review and evaluation of performance.

UNIT 36

Basic Fast-Fit Operations

Learning Outcomes

Section 1 Health and Safety, Careers and Environmental Regulations

Learners should be able to:

- understand the main principles of the Health and Safety at Work Act (HASAWA) 1974, in particular the health and safety risks in a specific job role and the precautions to take to minimise risk;
- understand the importance of personal presentation and conduct in maintaining health and safety in the workplace;
- take appropriate health and safety precautions relating to brake dust;
- work in a way that minimises the risk of:
  - damage to vehicle systems;
  - damage to the components;
  - contact with leakage; and
  - contact with hazardous substances;
- understand the environmental regulations in relation to the safe disposal or recycling of waste, including batteries, tyres, brake components, waste engine oil and oil filters and understand the consequences of not doing so;
- describe three opportunities for careers related to the motor vehicle industry; and
- evaluate their own performance in practical tasks.

Section 2 Components and Terminology

Learners should be able to:

- understand and use specialist vocabulary relating to light vehicle basic fast-fit operations;
- understand basic fast-fit components, including:
  - wheels, tyres, patches, plugs, balance weights, batteries, brake pads, brake discs, brake shoes, brake drums, cooling systems, exhausts, springs and dampers, engine oils and engine oil filters;
- be familiar with fittings/fixings for fast-fit components such as:
  - wheel nuts, lock nuts, exhaust clamps, battery clamps, battery terminals, hose clips, brake fluid, brake calliper securing bolts, anti-squeal shims, sump plug and washers, bolts, nuts and washers, screws and self-tapping screws, cable ties, terminals and connectors; and
- evaluate their own performance in practical tasks.

Section 3 Tools and Equipment

Learners should be able to:

- understand the use of tools and equipment relating to light vehicle fast-fit operations and tools for specific tasks, for example: spanners, sockets, screwdrivers, hexagon socket spanners, torque wrenches, self-locking pliers, vice grips, air wrenches/guns, pliers, levers, hammers, tread depth gauges, tyre pressure gauges, micrometers, coolant testers, battery testers, hydrometers, trolley jacks, axle stands (both high and low reach) vehicle hoists, tyre changing machines and wheel balancing machines;
- select and use the correct tools and equipment for the components they are going to remove and refit;
- ensure that the tools and equipment they require are in a safe working condition and are returned in the same condition to the correct location after use; and
- evaluate their own performance in practical tasks.

Section 4 Practical Tasks

Learners should be able to:

- remove and replace wheels (alloy and steel rims);
- remove tyres from wheel rims and refit (alloy and steel rims);
- carry out a wheel balance (on above);
- carry out a battery test, remove and refit a battery;
- remove, inspect and refit brake pads;
- remove, inspect, measure and refit brake discs;
- remove, inspect and refit brake drums and brake shoes (including adjustment);
- remove and refit one complete exhaust system;
- remove, inspect and refit one telescopic damper;
- remove, inspect and refit one suspension strut unit (MacPherson strut system);
- carry out one lubrication service (engine oil and oil filter);
- drain engine cooling system, remove and refit radiator, refill and test strength of coolant;
- evaluate their own performance in practical tasks; and
- carry out an end-of-unit evaluation.

UNIT 36

Basic Fast-Fit Operations

Assessment Guidance

Observation of work activities, examination of work completed, job cards, check sheets and photographic evidence are the preferred means of assessment. Written or oral questioning and practical demonstrations are recommended, since these are considered the most appropriate for this qualification. The importance of a safe working environment and the careful use of tools and equipment should be taken into consideration.

Teaching centres will require appropriate resources to deliver this unit to industry standards including cars (the number of cars is dependent on the size of the class). The teaching centres will also require multiple tools and fast-fit components/resources such as brake pads, exhausts, oil, and oil filters.

Learners should undertake a minimum of four assessment tasks from the practical tasks listed in Section 4.

Exemplar Assessment

This example is for removing and replacing wheels.

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- read and understand instructions or task details on a job card or check sheet;
- prepare the work area and vehicle for the set task;
- select the correct tools and equipment;
- work safely to remove and replace wheels, including alloy and steel rims;
- adjust and refit components and ensure they operate correctly;
- return and maintain tools and equipment in the appropriate manner;
- tidy the work area and correctly dispose of waste products;
- complete and sign off a job card or check sheet (additional faults recorded);
- present the vehicle for assessment and feedback;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Basic Fast-Fit Operations

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate an excellent understanding of the potential hazards and safe working practices while using workshop components, equipment and basic hand tools in a motor vehicle workshop	• Demonstrate a very good understanding of the potential hazards that can exist while using workshop components, equipment and basic hand tools in a motor vehicle workshop	• Demonstrate a good understanding of the potential hazards while using workshop components, equipment and basic hand tools in a motor vehicle workshop
		• Demonstrate excellent knowledge of environmental issues related to fast-fit operations, including tidying the work area, recycling and disposing of waste	• Demonstrate very good knowledge of environmental issues related to fast-fit operations, including tidying the work area, recycling and disposing of waste	• Demonstrate good knowledge of environmental issues related to fast-fit operations, including tidying the work area, recycling and disposing of waste
		• Demonstrate excellent understanding of career opportunities related to the industry	• Demonstrate very good understanding of career opportunities related to the industry	• Demonstrate good understanding of career opportunities related to the industry
	Materials and related skills and knowledge	• Demonstrate excellent understanding of the fast-fit service sector	• Demonstrate very good understanding of the fast-fit service sector	• Demonstrate good understanding of the fast-fit service sector
		• Demonstrate an excellent working knowledge of the equipment, tools and components used to carry out fast-fit operations	• Demonstrate a very good working knowledge of the equipment, tools and components used to carry out fast-fit operations	• Demonstrate a good working knowledge of the equipment, tools and components used to carry out fast-fit operations

UNIT 36

Basic Fast-Fit Operations

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate a satisfactory understanding of the potential hazards and safe working practices while using workshop components, equipment and basic hand tools in a motor vehicle workshop	• Demonstrate a basic understanding of the potential hazards and safe working practices while using workshop components, equipment and basic hand tools in a motor vehicle workshop
		• Demonstrate satisfactory knowledge of environmental issues related to fast-fit operations, including tidying the work area, recycling and disposing of waste	• Demonstrate basic knowledge of environmental issues related to fast-fit operations, including tidying the work area, recycling and disposing of waste
		• Demonstrate satisfactory understanding of career opportunities related to the industry	• Demonstrate basic understanding of career opportunities related to the industry
	Materials and related skills and knowledge	• Demonstrate satisfactory understanding of the fast-fit service sector	• Demonstrate basic understanding of the fast-fit service sector
		• Demonstrate a satisfactory working knowledge of the workshop equipment, tools and components used to carry out fast-fit operations	• Demonstrate a basic working knowledge of the workshop equipment, tools and components used to carry out fast-fit operations

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Resources**	• Show evidence of making excellent use of resources	• Show evidence of making very good use of resources	• Show evidence of making good use of resources
	Written records	• Demonstrate excellent skills in keeping records of practical tasks, including job cards, check or data sheets	• Demonstrate very good skills in keeping records of practical tasks, including job cards, check or data sheets	• Demonstrate good skills in keeping records of practical tasks, including job cards, check or data sheets
	Tools and equipment	• Demonstrate excellent use of machines, tools and equipment relating to vehicle fast-fit techniques	• Demonstrate very good use of machines, tools and equipment relating to vehicle fast-fit techniques	• Demonstrate good use of machines, tools and equipment relating to vehicle fast-fit techniques
	Planning	• Demonstrate excellent planning skills and have all tools, equipment and components available before starting the tasks	• Demonstrate very good planning skills and have all tools, equipment and components available before starting the tasks	• Demonstrate a good planning skills and have all tools, equipment and components available before starting the tasks
	Practical activity	• Carry out fast-fit service tasks to an excellent standard, ensuring tasks are completed in the correct order and within the agreed timescale	• Carry out fast-fit service tasks to a very good standard, ensuring tasks are completed in the correct order and within the agreed timescale	• Carry out fast-fit service tasks to a good standard, ensuring tasks are completed in the correct order and within the agreed timescale
	Waste materials and recycling	• Demonstrate excellent ability to recycle or dispose of waste from fast-fit tasks	• Demonstrate very good ability to recycle or dispose of waste from fast-fit tasks	• Demonstrate good ability to recycle or dispose of waste from fast-fit tasks

Basic Fast-Fit Operations

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Resources**	• Show evidence of making satisfactory use of resources	• Show evidence of making basic use of resources
	Written reports	• Demonstrate satisfactory skills in keeping records of practical tasks, including job cards, check or data sheets	• Demonstrate basic skills in keeping records of practical tasks, including job cards, check or data sheets
	Tools and equipment	• Demonstrate satisfactory use of machines, tools and equipment relating to vehicle fast-fit techniques	• Demonstrate basic use of machines, tools and equipment relating to vehicle fast-fit techniques
	Planning	• Demonstrate satisfactory planning skills and have all tools, equipment and components available before starting tasks	• Demonstrate basic planning skills and have all tools, equipment and components available before starting tasks
	Practical activity	• Carry out fast-fit service tasks to a satisfactory standard, ensuring tasks are completed in correct order and within the agreed timescale	• Carry out fast-fit service tasks to a basic standard, ensuring tasks are completed in correct order and within the agreed timescale
	Waste materials and recycling	• Demonstrate satisfactory ability to recycle or dispose of waste from fast-fit tasks	• Demonstrate basic ability to recycle or dispose of waste from fast-fit tasks

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	Task evaluation	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	Task evaluation	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

UNIT 36

Basic Fast-Fit Operations

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Resources						
Written records						
Tools and equipment						
Planning						
Practical activity						
Waste materials and recycling						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Basic Vehicle Body Components and Fitting

UNIT 37

This unit is suitable for learners who wish to gain a basic understanding of vehicle body components and fittings and who may be interested in pursuing careers in vehicle body repairs. Learners will also gain knowledge and understanding of health and safety in the workplace and other skills associated with working in a garage.

The physical resources needed to support the delivery and assessment of this unit should be of industry standard. Staff delivering the programme and conducting the assessment should be fully acquainted with current practice and standards in the sector.

Learners will explore career opportunities available in the motor vehicle industry.

This unit includes:

- consideration of appropriate Personal Protective Equipment (PPE), and the application of safe working practices;
- consideration of career opportunities available in the motor vehicle industry;
- consideration of environmental regulations relating to the safe disposal of vehicle fluids or components;
- understanding and use of specialist vocabulary relating to light vehicles;
- understanding the purpose of fixings and fastenings and major components of motor vehicles;
- understanding of equipment and tools used in the motor vehicle industry;
- storage and use of tools and equipment;
- dismantling, inspecting and rebuilding bumpers, lights, bonnet and boot;
- removing, testing and replacing door trim; and
- a review and evaluation of performance.

UNIT 37

Basic Vehicle Body Components and Fitting

Learning Outcomes

Section 1 Health and Safety, Careers and Environmental Regulations

Learners should be able to:

- select appropriate Personal Protective Equipment (PPE);
- understand the implications of the Health and Safety at Work Act (HASAWA) 1974 in relation to this occupational area;
- describe three career options available in the motor vehicle industry;
- work in a way that minimises the risk of:
  - damage to other vehicle systems;
  - damage to the other components;
  - contact with leakage; and
  - contact with hazardous substances;
- explain the environmental regulations about the safe disposal of waste components and materials and the consequences to others and the environment of not doing so; and
- evaluate their own performance in practical tasks.

Section 2 Major Components and Trim

Learners should be able to:

- understand and use specialist vocabulary relating to light vehicle body components and trim;
- have an understanding of vehicle components and trim, including bumpers, doors, bonnet, boot lid, light units, glass, and battery;
- select and use fastenings/fixings for major components such as: bolts, nuts, Nylock nuts, flat washers, split lock washers, screws, self-tapping screws, clips, rivets, adhesive and sealants; and
- evaluate their own performance in practical tasks.

Section 3 Tools and Equipment

Learners should be able to:

- understand the use of tools and equipment relating to light vehicle body components, body trim and tools for specific tasks, for example spanners, socket sets, screwdrivers, hammers, pliers and self-locking grips, power drills and drill bits, rivet guns, manufacturer's specified tools, torque wrenches, trolley jacks and low and high reach axle stands;
- select and use the correct tools and equipment for the components they are going to remove and refit;
- ensure that the tools and equipment they require are in a safe working condition and are returned in same condition to the correct location after use; and
- evaluate their own performance in practical tasks.

Section 4 Practical Tasks

Learners should be able to:

- remove and refit one front or one rear bumper on a vehicle;
- remove and refit one headlight unit and one tail light unit on a vehicle;
- disconnect battery, remove and refit back into vehicle;
- remove and refit one bonnet or one boot lid on a vehicle;
- remove and refit one door mirror and one interior door trim panel on a vehicle;
- remove and refit one drop window on a vehicle;
- evaluate their own performance in the practical tasks; and
- carry out an end-of-unit evaluation.

UNIT 37

Basic Vehicle Body Components and Fitting

Assessment Guidance

Teachers/Lecturers should stress the importance of a clean, tidy and safe working environment.

Assessment of this should include tidying the area, safely removing all dirt, and cleaning all tools used. Waste materials should be recycled if possible or disposed of in an environmentally friendly way.

Observation of work activities, examination of work completed, job cards, check sheets and photographs are the preferred means of assessment. Written or oral questions and practical demonstrations are recommended.

Practical occupational tasks selected should reflect the breadth of opportunity for learners to be stretched and challenged when demonstrating their skills in line with this unit.

Teaching centres will require appropriate resources, including cars, to deliver this unit to industry standards.

Teaching centres will also require multiple tools and vehicle body components/resources as listed in the unit content.

Four practical assessment tasks should be carried out, selected from those tasks listed in Section 4.

Exemplar Assessment

Remove and refit one front bumper on a vehicle.

Learners:

- answer questions to demonstrate the knowledge and understanding required;
- interpret instructions/task details on job card or check sheet;
- prepare the work area and vehicle for the set task;
- select tools and equipment for task;
- ensure that the tools and equipment required are in a safe working condition;
- work in a way which minimises the risk of:
  - damage to vehicle systems;
  - damage to vehicle components;
  - contact with leakage; and
  - contact with hazardous substances;
- prepare a safe storage area for components removed from the vehicle;
- conduct and complete tasks to manufacturers' or workshop specifications;
- refit and adjust components;
- maintain and return tools and equipment in the appropriate manner;
- tidy the work area and dispose of waste products;
- complete and sign a job card or check sheet;
- present the vehicle for assessment and feedback;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Basic Vehicle Body Components and Fitting

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate excellent understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle body repair workshop	• Demonstrate very good understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle body repair workshop	• Demonstrate good understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle body repair workshop
		• Demonstrate excellent understanding of environmental issues, including tidying the work area, recycling and disposing of waste	• Demonstrate very good understanding of environmental issues, including tidying the work area, recycling and disposing of waste	• Demonstrate good understanding of environmental issues, including tidying the work area, recycling and disposing of waste
		• Demonstrate excellent understanding of career opportunities in vehicle body repair	• Demonstrate a very good understanding of career opportunities in vehicle body repair	• Demonstrate good understanding of career opportunities in vehicle body repair
	Materials and related skills and knowledge	• Demonstrate excellent knowledge of vehicle body repair tools, components and equipment	• Demonstrate very good knowledge of vehicle body repair tools, components and equipment	• Demonstrate good knowledge of vehicle body repair tools, components and equipment
		• Provide an excellent explanation of the body repair sector	• Provide a very good explanation of the body repair sector	• Provide a good explanation of the body repair sector

UNIT 37 Basic Vehicle Body Components and Fitting

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate satisfactory understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle body repair workshop	• Demonstrate basic understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle body repair workshop
		• Demonstrate satisfactory understanding of environmental issues, including tidying the work area, recycling and disposing of waste	• Demonstrate basic understanding of environmental issues, including tidying the work area, recycling and disposing of waste
		• Demonstrate satisfactory understanding of career opportunities in vehicle body repair	• Demonstrate basic understanding of career opportunities in vehicle body repair
	Materials and related skills and knowledge	• Demonstrate satisfactory knowledge of vehicle body repair tools, components and equipment	• Demonstrate basic knowledge of vehicle body repair tools, components and equipment
		• Provide a satisfactory explanation of the body repair sector	• Provide a basic explanation of the body repair sector

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Resources**	• Demonstrate excellent use of resources	• Demonstrate very good use of resources	• Demonstrate good use of resources
	Written records	• Demonstrate excellent skills in keeping records of practical tasks, including job cards and check or data sheets	• Demonstrate very good skills in keeping records of practical tasks, including job cards and check or data sheets	• Demonstrate good skills in keeping records of practical tasks, including job cards and check or data sheets
	Tools and equipment	• Demonstrate excellent use of machines, tools and equipment relating to body repair techniques	• Demonstrate very good use of machines, tools and equipment relating to body repair techniques	• Demonstrates good use of machines, tools and equipment relating to body repair techniques
	Planning	• Demonstrate excellent planning skills and have all tools, equipment and components available before starting the tasks	• Demonstrate very good planning skills and have all tools, equipment and components available before starting the tasks	• Demonstrate good planning skills and have all tools, equipment and components available before starting the tasks
	Practical activity	• Carry out body repair tasks to an excellent standard, ensuring all tasks are completed in the correct order and within the agreed timescale	• Carry out body repair tasks to a very good standard, ensuring all tasks are completed in the correct order and within the agreed timescale	• Carry out body repair tasks to a good standard, ensuring all tasks are completed in the correct order and within the agreed timescale
	Waste materials and recycling	• Demonstrate excellent ability to recycle or dispose of all waste from the body repair tasks	• Demonstrate very good ability to recycle or dispose of all waste from the body repair tasks	• Demonstrate good ability to recycle or dispose of all waste from the body repair tasks

Basic Vehicle Body Components and Fitting

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Resources**	• Demonstrate satisfactory use of resources	• Demonstrate basic use of resources
	Written reports	• Demonstrate satisfactory skills in keeping records of practical tasks, including job cards and check or data sheets	• Demonstrate basic skills in keeping records of practical tasks, including job cards and check or data sheets
	Tools and equipment	• Demonstrate satisfactory use of machines, tools and equipment relating to body repair techniques	• Demonstrate basic use of machines, tools and equipment relating to body repair techniques
	Planning	• Demonstrate satisfactory planning skills and have all tools, equipment and components available before starting the tasks	• Demonstrate basic planning skills and have all tools, equipment and components available before starting the tasks
	Practical activity	• Carry out body repair tasks to a satisfactory standard, ensuring all tasks are completed in the correct order and within the agreed timescale	• Carry out body repair tasks to a basic standard, ensuring all tasks are completed in the correct order and within the agreed timescale
	Waste materials and recycling	• Demonstrate satisfactory ability to recycle or dispose of all waste from the body repair tasks	• Demonstrate basic ability to recycle or dispose of all waste from the body repair tasks

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	Task evaluation	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	Task evaluation	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of basic evaluations for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

UNIT 37

Basic Vehicle Body Components and Fitting

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Resources						
Written records						
Tools and equipment						
Planning						
Practical activity						
Waste materials and recycling						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Computer Aided Design

UNIT 38

This unit introduces learners to basic skills in the use of an industry standard Computer Aided Design (CAD) drafting package.

Learners will also have the option of creating drawings in the disciplines of:

- engineering (manufacturing);
- engineering (electronic layout drawings);
- construction (architecture);
- construction (joinery component manufacture);
- construction (electrical layout drawings); or
- any other relevant discipline.

This unit includes:

- consideration of health and safety issues in CAD;
- consideration of career opportunities in CAD;
- routine drafting techniques in CAD;
- creating component drawings in CAD;
- consideration of environmental issues in CAD; and
- a review and evaluation of performance.

UNIT 38

Computer Aided Design

Learning Outcomes

Section 1 Safety Checks, Careers, the Environment and Routine Drafting Techniques

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA) 1974 in relation to this occupational area;
- position monitor and seating in accordance with British Standards Institute (BSI) requirements;
- identify energy efficient computer equipment and end-of-life recycling methods;
- use at least five of these drawing commands: line, circle, arc, ellipse, polyline, hatch and rectangle;
- use these modification commands: trim, stretch, break, extend and scale;
- draw a range of basic components from a relevant discipline;
- demonstrate a knowledge and understanding of how to retrieve and plot a scale drawing;
- describe three career opportunities in related industries;
- use a paper-free environment except for the final drawing to reduce environmental impact; and
- evaluate their own performance in practical tasks.

Section 2 Creating Components (Blocks)

Learners should be able to:

- understand the basic principles of technical drawing;
- have a knowledge of the layout required for drawings such as position of plans and end and front elevations;
- use the skills developed in section one to create at least two component drawings for a library of symbols, to which they may add from components supplied by the teaching centre;
- use their CAD skills to generate a title block template, including text;
- set up a model space environment;
- set up a paper space environment for printing to a recognised scale; and
- evaluate their own performance in practical tasks.

Section 3 Working Drawing and Graphic Presentation

Learners should be able to:

- draw a plan view and a front view or make a range of drawings from either an engineering or a construction discipline, using the components created in Section 2;
- add dimensions to their drawing;
- create a completed working drawing from their selected discipline;
- plot hard copies of their working drawing and associated components;
- create a file storage area with an appropriate name and location;
- save files in this storage area for future use;
- evaluate their own performance in practical tasks; and
- carry out an end-of-unit evaluation.

Assessment Guidance

Learners should carry out practical drafting activities associated with their chosen discipline.

Learners will be assessed on the quality of their final drawing, including the accuracy of lines joining at corners and the components drawn.

Learner should take approximately thirty hours to complete the final assessment drawing.

Learners must show evidence of having evaluated their own work.

Teaching centres are expected to use an industry standard drafting package with an individual drafting station for each learner.

Learners should have access to an individual computer and the software used should be capable of producing high quality 2D drawings.

Learners should have access to a printer capable of printing drawings to the specified scale. All drawings presented for moderation must be A3 size to show the detail in the drawings.

To enhance the learners' experience, teachers/lecturers may wish to deliver this unit in parallel with a construction craft unit or an engineering unit. Where learners are manufacturing a tool box from folded sheet metal, there could be partnerships with engineering. Learners could prepare the drawings for the tool box using a CAD system prior to manufacture. Where learners prepare the drawings for a piece of furniture or a construction component, there could be partnerships in the Carpentry and Joinery unit.

One assessment task should be carried out.

Exemplar Assessment

Drawing of a toolbox to be manufactured from sheet metal.

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- open an A3 template file;
- insert name, date, scale, drawing title and number;
- set up a drawing environment, including drawing limits, and viewpoints as necessary;
- produce a working drawing of a sheet metal toolbox using a CAD package;
- add dimensions to drawing;
- add appropriate annotation;
- plot the drawing to scale;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

UNIT 38

Computer Aided Design

Performance Descriptors: Computer Aided Design

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Provide an excellent demonstration of how to position the monitor and seating in accordance with BSI standards • Demonstrate excellent understanding of the energy efficiency and waste reduction procedures when using computers • Demonstrate an excellent understanding of career opportunities and potential progression in relation to CAD	• Provide a very good demonstration of how to position the monitor and seating in accordance with BSI standards • Demonstrate very good understanding of the energy efficiency and waste reduction procedures when using computers • Demonstrate a very good understanding of career opportunities and potential progression in relation to CAD	• Provide a good demonstration of how to position the monitor and seating in accordance with BSI standards • Demonstrate good understanding of the energy efficiency and waste reduction procedures when using computers • Demonstrate a good understanding of career opportunities and potential progression in relation to CAD
	Materials and related skills and knowledge	• Identify, to an excellent standard, the principal drawing and modification commands, file storage and environmental issues	• Identify, to a very good standard, the principal drawing and modification commands, file storage and environmental issues	• Identify, to a good standard, the principal drawing and modification commands, file storage and environmental issues

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Provide a satisfactory demonstration of how to position the monitor and seating in accordance with BSI standards	• Provide a basic demonstration of how to position the monitor and seating in accordance with BSI standards
		• Demonstrate a satisfactory understanding of career opportunities and potential progression in relation to CAD	• Demonstrate a basic understanding of career opportunities and potential progression in relation to CAD
		• Demonstrate satisfactory understanding of the energy efficiency and waste reduction procedures when using computers	• Demonstrate basic understanding of the energy efficiency and waste reduction procedures when using computers
	Materials and related skills and knowledge	• Identify, to a satisfactory standard, the principal drawing and modification commands, file storage and environmental issues	• Identify, to a basic standard, the principal drawing and modification commands, file storage and environmental issues

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Symbols library**	• Demonstrate excellent skills when using drawing and modification commands to create at least two components for a drawing symbols library	• Demonstrate very good skills when using drawing and modification commands to create at least two components for a drawing symbols library	• Demonstrate good skills when using drawing and modification commands to create at least two components for a drawing symbols library
	Create template file	• Create a template file to produce an excellent paper space title block to a standard sheet size	• Create a template file to produce a very good paper space title block to a standard sheet size	• Create a template file to produce a good paper space title block to a standard sheet size
	Model space plan view	• Create a drawing environment to an excellent standard that allows for a plan view of a suitably complex engineering or construction drawing	• Create a drawing environment to a very good standard that allows for a plan view of a suitably complex engineering or construction drawing	• Create a drawing environment to a good standard that allows for a plan view of a suitably complex engineering or construction drawing
	Model space front view	• Create a drawing environment to an excellent standard that allows for a front view of a suitably complex engineering or construction drawing	• Create a drawing environment to a very good standard that allows for a front view of a suitably complex engineering or construction drawing	• Create a drawing environment to a good standard that allows for a front view of a suitably complex engineering or construction drawing
	Working drawing	• Create a complete working drawing to an excellent standard, including principal dimensions	• Create a complete working drawing to a very good standard, including principal dimensions	• Create a complete working drawing to a good standard, including principal dimensions
	Hard/Printed copies	• Create final drawings of excellent general appearance that are fit for purpose and at an industry recognised scale	• Create final drawings of very good general appearance that are fit for purpose and at an industry recognised scale	• Create final drawings of good general appearance that are fit for purpose and at an industry recognised scale

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Symbols library**	• Demonstrate satisfactory skills when using drawing and modification commands to create at least two components for a drawing symbols library	• Demonstrate basic skills when using drawing and modification commands to create at least two components for a drawing symbols library
	Create template file	• Create a template file to produce a satisfactory paper space title block to a standard sheet size	• Create a template file to produce a basic paper space title block to a standard sheet size
	Model space plan view	• Create a drawing environment to a satisfactory standard that allows for a plan view of a suitably complex engineering or construction drawing	• Create a drawing environment to a basic standard that allows for a plan view of a suitably complex engineering or construction drawing
	Model space front view	• Create a drawing environment to a satisfactory standard that allows for a front view of a suitably complex engineering or construction drawing	• Create a drawing environment to a basic standard that allows for a front view of a suitably complex engineering or construction drawing
	Working drawing	• Create a complete working drawing to a satisfactory standard, including principal dimensions	• Create a complete working drawing to a basic standard, including principal dimensions
	Hard/Printed copies	• Create final drawings of satisfactory general appearance that are fit for purpose and at an industry recognised scale	• Create final drawings of basic general appearance that are fit for purpose and at an industry recognised scale

Computer Aided Design

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	Task evaluation	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	Task evaluation	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Symbols library						
Create template file						
Model space plan view						
Model space front view						
Working drawing						
Hard/Printed copies						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Electronic Circuit Construction

UNIT 39

This unit is suitable for those who wish to gain a basic knowledge and understanding of constructing electronic circuits. Learners will develop skills to identify electronic components and assemble electronic circuits. They will use soldering techniques to build electronic circuits and carry out tests to ensure they operate correctly.

This unit includes:

- consideration of health and safety issues in electronic circuit construction;
- consideration of career opportunities related to electronic circuit construction;
- consideration of environmental issues relating to electronics;
- identification of electronic components and interpretation of electronic circuit diagrams;
- preparation of the work area, materials, tools and equipment;
- construction and assembly of electronic circuits, using discrete components and soldering techniques;
- carrying out checks to ensure circuits perform as designed; and
- a review and evaluation of performance.

UNIT 39

Electronic Circuit Construction

Learning Outcomes

Section 1 Health and Safety, Hand Tools, Careers, Electronic Components and the Environment

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA) 1974 in relation to this occupational area;
- understand electrical hazards in the electronic laboratory;
- understand and apply safe working practices when using tools and equipment in the electronic laboratory;
- describe three career opportunities related to electronic circuit construction;
- identify and select the correct tools and equipment to use;
- identify specific components such as resistors including their colour code, capacitors, switches, light emitting diodes (LEDs), transistors, and integrated circuits;
- become familiar with the use of power supplies, soldering stations, hand tools and multimeters;
- operate soldering irons in a safe manner and know what steps to take in the event of a solder burn;
- select different supply voltages and be able to use correct assembly tools;
- read, sketch and understand basic circuit diagrams;
- convert circuit diagrams into physical construction diagrams including stripboard diagrams;
- use a computer circuit simulation to produce, test and print circuit diagrams;
- demonstrate an appreciation of environmental issues relating to the sourcing of components and the materials from which they are made;
- demonstrate how to recycle old components and how to dispose of waste in an environmentally friendly way; and
- evaluate their own performance in practical tasks.

Section 2 Construct and Assemble Electronic Circuits

Learners should be able to:

- prepare the work area for circuit assembly, ensuring sufficient clear space to safely build the circuit;
- follow safe working practices to position and secure electronic components;
- correctly build circuits on stripboard or equivalent;
- use neat soldering techniques to build electronic circuits, avoiding loose wires or components, short circuits, surplus solder or overheating;
- demonstrate soldering techniques that ensure all soldered joints are mechanically and electrically sound, free from excess solder, track crossover, solder spikes or heat damage; and
- evaluate their own performance in practical tasks.

Section 3 Checking and Testing Circuits to Ensure Satisfactory Circuit Construction and Performance

Learners should be able to:

- visually check correct positioning of components and wiring;
- visually check for burnt or damaged insulation or components;
- visually recognise excessive solder causing potential short circuits;
- carry out checks to ensure the circuit operates as designed;
- set up a multimeter and carry out voltage and resistance measurements;
- test the circuit function using a power supply, and indicators such as bulbs, LEDs or buzzers, where appropriate;
- evaluate their own performance in practical tasks; and
- carry out an end-of-unit evaluation.

UNIT 39

Electronic Circuit Construction

Assessment Guidance

The teacher/lecturer should emphasise the importance of safe working practice and a clean, tidy work area in an electronic laboratory.

Observation of work activities, examination of work completed and written records are the preferred means of assessment. Written or oral questioning and practical demonstration are recommended.

The practical occupational tasks selected should provide opportunities for learners to be stretched and challenged when demonstrating their skills in line with this specification.

Centres delivering this unit should be suitably resourced with multiple hand tools, consumable components, multiple soldering stations and stripboards or equivalent, based on class size.

Two practical assessment tasks should be carried out.

Exemplar Assessment

Circuit using light sensing circuit/timer circuit

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- read a circuit drawing;
- convert and test a circuit;
- convert a drawing to stripboard diagram;
- prepare the work area, identify and select tools and equipment;
- identify and select required components from circuit diagram;
- place component and wires to build circuit onto stripboard (or equivalent);
- neatly solder the components;
- visually check the positioning of the components;
- check for loose wires, short circuits and heat damage;
- test the circuit functions as designed, using power supply;
- set up and use a multimeter to carry out voltage and resistance tests;
- demonstrate safe working practice throughout;
- return tools and equipment in an appropriate manner;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Electronic Circuit Construction

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate excellent understanding of potential hazards and safe working practices when using tools and equipment in the electronic laboratory	• Demonstrate very good understanding of potential hazards and safe working practices when using tools and equipment in the electronic laboratory	• Demonstrate good understanding of potential hazards and safe working practices when using tools and equipment in the electronic laboratory
		• Demonstrate excellent understanding of the importance of leaving the workshop tidy and safe, by recycling or disposing of waste in an environmentally friendly way	• Demonstrate very good understanding of the importance of leaving the workshop tidy and safe, by recycling or disposing of waste in an environmentally friendly way	• Demonstrate good understanding of the importance of leaving the workshop tidy and safe, by recycling or disposing of waste in an environmentally friendly way
		• Demonstrate an excellent understanding of career opportunities related to electronic circuit construction	• Demonstrate a very good understanding of career opportunities related to electronic circuit construction	• Demonstrate a good understanding of career opportunities related to electronic circuit construction
	Materials and related skills and knowledge	• Demonstrate excellent knowledge when selecting and using different types of basic electronic circuit construction tools and equipment	• Demonstrate very good knowledge when selecting and using different types of basic electronic circuit construction tools and equipment	• Demonstrate good knowledge when selecting and using different types of basic electronic circuit construction tools and equipment
		• Demonstrate excellent understanding of basic electronic circuit diagrams	• Demonstrate very good understanding of basic electronic circuit diagrams	• Demonstrate good understanding of basic electronic circuit diagrams
		• Demonstrate excellent understanding of how electronic circuit boards and their components work	• Demonstrate very good understanding of how electronic circuit boards and their components work	• Demonstrate good understanding of how electronic circuit boards and their components work

Electronic Circuit Construction

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate satisfactory understanding of potential hazards and safe working practices when using tools and equipment in the electronic laboratory	• Demonstrate basic understanding of potential hazards and safe working practices when using tools and equipment in the electronic laboratory
		• Demonstrate satisfactory understanding of the importance of leaving the workshop tidy and safe, by recycling or disposing of waste in an environmentally friendly way	• Demonstrate basic understanding of the importance of leaving the workshop tidy and safe, by recycling or disposing of waste in an environmentally friendly way
		• Demonstrate a satisfactory understanding of career opportunities related to electronic circuit construction	• Demonstrate a basic understanding of career opportunities related to electronic circuit construction
	Materials and related skills and knowledge	• Demonstrate satisfactory knowledge when selecting and using different types of basic electronic circuit construction tools and equipment	• Demonstrate basic knowledge when selecting and using different types of basic electronic circuit construction tools and equipment
		• Demonstrate satisfactory understanding of basic electronic circuit diagrams	• Demonstrate basic understanding of basic electronic circuit diagrams
		• Demonstrate satisfactory understanding of how electronic circuit boards and their components work	• Demonstrate basic understanding of how electronic circuit boards and their components work

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Drawings**	• Demonstrate ability to interpret the diagram provided and convert it to a computer drawing to allow testing, showing an excellent level of understanding	• Demonstrate ability to interpret the diagram provided and convert it to a computer drawing to allow testing, showing a very good level of understanding	• Demonstrate ability to interpret the diagram provided and convert it to a computer drawing to allow testing, showing a good level of understanding
	Component identification	• Identify 9 or 10 components in the diagram provided	• Identify 7 or 8 components in the diagram provided	• Identify 5 or 6 components in the diagram provided
	Accuracy of assembly	• Demonstrate that components are placed with excellent accuracy and neatness	• Demonstrate that components are placed with very good accuracy and neatness	• Demonstrate that components are placed with good accuracy and neatness
	Soldering techniques	• Carry out accurate soldering to an excellent standard so that the finished circuit has excellent general appearance	• Carry out accurate soldering to a very good standard so that the finished circuit has very good general appearance	• Carry out accurate soldering to a good standard so that the finished circuit has good general appearance
	Inspection	• Demonstrate excellent ability to carry out a visual inspection of components and soldered joints	• Demonstrate very good ability to carry out a visual inspection of components and soldered joints	• Demonstrate good ability to carry out a visual inspection of components and soldered joints
	Testing	• Demonstrate excellent skills when testing the circuit using a multimeter	• Demonstrate very good skills when testing the circuit using a multimeter	• Demonstrate good skills when testing the circuit using a multimeter
		• Demonstrate excellent ability to test the circuit with a power supply and ensure that it is fit for purpose	• Demonstrate very good ability to test the circuit with a power supply and ensure that it is fit for purpose	• Demonstrate good ability to test the circuit with a power supply and ensure that it is fit for purpose

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Drawings**	• Demonstrate ability to interpret the diagram provided and convert to a computer drawing to allow testing, showing an satisfactory level of understanding	• Demonstrate ability to interpret the diagram provided and convert to a computer drawing to allow testing, showing a basic level of understanding
	Component identification	• Identify 3 or 4 components in the diagram provided	• Identify 2 components in the diagram provided
	Accuracy of assembly	• Demonstrate that components are placed with satisfactory accuracy and neatness	• Demonstrate that components are placed with basic accuracy and neatness
	Soldering techniques	• Carry out accurate soldering to a satisfactory standard so that the finished circuit has satisfactory general appearance	• Carry out accurate soldering to a basic standard so that the finished circuit has basic general appearance
	Inspection	• Demonstrate satisfactory ability to carry out a visual inspection of components and soldered joints	• Demonstrate basic ability to carry out a visual inspection of components and soldered joints
	Testing	• Demonstrate satisfactory skills when testing the circuit using a multimeter	• Demonstrate basic skills when testing the circuit using a multimeter
		• Demonstrate satisfactory ability to test the circuit with a power supply and ensure that it is fit for purpose	• Demonstrate basic ability to test the circuit with a power supply and ensure that it is fit for purpose

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	Task evaluation	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	Task evaluation	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

UNIT 39

Electronic Circuit Construction

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Drawings						
Component identification						
Accuracy of assembly						
Soldering techniques						
Inspection						
Testing						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Electrical Wiring Installation

UNIT 40

This unit is designed to develop vocational skills in electrical wiring installations and associated practical activities. Learners will use a range of tools and equipment to install and connect electrical components and cables to produce circuits for lighting and power installations. They will use appropriate methods to inspect and test circuitry.

This unit includes:

- consideration of health and safety issues in practical workshop activities in electrical installation;
- consideration of career opportunities in electrical installation;
- consideration of environmental issues of electrical wiring;
- selection and use of appropriate hand tools and measuring equipment;
- following instructions and diagrammatic guidelines;
- development of the techniques of measuring, cutting and preparing cables;
- installation and connection of electrical components and cables into a functional circuit;
- testing the circuitry, using measuring equipment and appropriate methods; and
- a review and evaluation of performance.

UNIT 40

Electrical Wiring Installation

Learning Outcomes

Section 1 Health and Safety Procedures, Careers, the Environment and Good Housekeeping

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA)1974 in relation to this occupational area;
- identify and use appropriate Personal Protective Equipment (PPE), for example safety boots, safety glasses, and boiler suit or apron;
- apply safe practices in the use of sharp and pointed tools such as screwdrivers, side cutters, wire strippers and bradawls;
- describe three career opportunities available in an electrical installers or as an electrician in a factory;
- recognise and apply any safety procedures necessary and be aware of any potential hazards arising in relation to the installation and connection of electrical equipment, for example when using steps, hammer, screwdrivers or cutters;
- remove cable cuttings and clippings from floor area for recycling;
- store tools and equipment used in the practical work to maintain a tidy and safe working environment;
- test for cable, cable insulation and earth faults using appropriate testing equipment;
- understand workshop procedures in the event of a fire or an accident;
- source materials from environmentally friendly suppliers; and
- evaluate their own performance in practical tasks.

Section 2 Selection of Tools and Equipment

Learners should be able to:

- identify and explain the purpose and function of the tools and equipment used in the installation and wiring of the circuitry, for example side cutters, pliers or junction boxes;
- select appropriate cables and components as required for the installation, for example single core, two core, twin and earth, ceiling rose pendant, single/double socket, consumer unit or cable clips;
- select use appropriate tools and instruments for tasks during installation, for example wire strippers, side cutters and multimeters; and
- evaluate their own performance in practical tasks.

Section 3 Produce, Inspect and Test Completed Circuitry

Learners should be able to:

- produce circuitry for lighting and power installations, for example:
  - single switch for single light connections;
  - single switch for multiple light connections;
  - double switch (two-way) for light connections;
  - single plug for single power connection;
  - double plug for single power connection;
  - ring main systems; and
  - consumer unit connection;
- interpret basic wiring diagrams to identify and select the types of cable or wiring and components to install to make up complete circuits;
- identify and use colour codes and different types of cable/wire for various types of circuitry;
- cut, prepare and connect the cable or wire to the components to establish the correct circuitry;
- select and use the following tools safely and competently: wire cutters, cable strippers, screwdrivers, pliers, side cutters, crimps and rule/measuring tapes;
- measure and cut cable/wire according to the diagram and to suit the circuit board;
- strip appropriate lengths of insulation from selected cable/wire and terminate end connections by trimming, crimping or bending to suit component terminals;
- attach the component backings according to the diagram, layout and secure cables or wires according to the diagram with cable or wire tails inside the component backings;
- complete the connections of the cable or wire ends to the component terminals according to the diagram and instructions, ensuring that earth wires have suitable sleeving at terminations;
- complete component assemblies by attaching front covers and apply any additional cable ties and clips to secure;
- inspect and evaluate completed circuits:
  - visual examination; and
  - test for continuity and insulation;
- test the circuitry for safe operation using test equipment and low voltage supply;
- agree outcomes with the teacher/lecturer and carry out any remedial work necessary to complete the circuit and ensure it functions;
- recycle all cable cuttings and reuse any extra clips or components;
- evaluate their own performance in the practical tasks; and
- carry out an end-of-unit evaluation.

UNIT 40

Electrical Wiring Installation

Assessment Guidance

Teachers/Lecturers should emphasise the importance of a safe working environment.

Observation of work activities, examination of work completed and written records are the preferred means of assessment. Practical demonstrations can be supported by oral and/or written questions to check the learner's knowledge and understanding.

The importance of a safe and tidy work area should be stressed. The assessment should include tidying the work area, safely removing all dirt, dust and debris and cleaning all the tools used. All waste materials must be recycled.

The practical occupational tasks selected should reflect the breadth of opportunity for learners to be stretched and challenged when demonstrating their skills in line with this specification.

Centres delivering this unit should be suitably resourced with multiple hand tools, consumable electric cable, electrical installation components, test equipment and mounting area/boards.

Three assessment tasks should be carried out to cover the unit requirements.

Exemplar Assessment

Construct an electrical lighting circuit incorporating a two-way double switch, ceiling rose pendant and consumer unit.

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- select a cubicle or installation board to complete practical task;
- select components to be installed and layout according to the diagram;
- select appropriate tools and equipment;
- attach components to designated surface;
- develop lines for economical and practical cable layout;
- test as necessary for safety and functionality (using a low voltage supply);
- close and secure all components and fittings;
- tidy the work area, return all tools and equipment and recycle waste appropriately;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Electrical Wiring Installation

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate excellent understanding of health and safety procedures and use of PPE • Demonstrate excellent ability to comply with workshop rules in event of fire or accident • Demonstrate excellent understanding of the importance of leaving the workshop safe and tidy and recycling or disposing of waste in an environmentally friendly way • Demonstrate an excellent understanding of three career opportunities in this industry	• Demonstrate very good understanding of health and safety procedures and use of PPE • Demonstrate very good ability to comply with workshop rules in event of fire or accident • Demonstrate very good understanding of the importance of leaving the workshop safe and tidy and recycling or disposing of waste in an environmentally friendly way • Demonstrate a very good understanding of three career opportunities in this industry	• Demonstrate good understanding of health and safety procedures and use of PPE • Demonstrate good ability to comply with workshop rules in event of fire or accident • Demonstrate good understanding of the importance of leaving the workshop safe and tidy and recycling or disposing of waste in an environmentally friendly way • Demonstrate a good understanding of three career opportunities in this industry
	Materials and related skills and knowledge	• Demonstrate excellent ability to identify and select materials and components for the tasks • Demonstrate excellent ability to identify and select test equipment to check circuitry	• Demonstrate very good ability to identify and select materials and components for the tasks • Demonstrate very good ability to identify and select test equipment to check circuitry	• Demonstrate good ability to identify and select materials and components for the tasks • Demonstrate good ability to identify and select test equipment to check circuitry

UNIT 40

Electrical Wiring Installation

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate satisfactory understanding of health and safety procedures and use of PPE	• Demonstrate basic understanding of health and safety procedures and use of PPE
		• Demonstrate satisfactory ability to comply with workshop rules in event of fire or accident	• Demonstrate basic ability to comply with workshop rules in event of fire or accident
		• Demonstrate satisfactory understanding of the importance of leaving the workshop safe and tidy and recycling or disposing of waste in an environmentally friendly way	• Demonstrate basic understanding of the importance of leaving the workshop safe and tidy and recycling or disposing of waste in an environmentally friendly way
		• Demonstrate a satisfactory understanding of three career opportunities in this industry	• Demonstrate a basic understanding of three career opportunities in this industry
	Materials and related skills and knowledge	• Demonstrate satisfactory ability to identify and select materials and components for the tasks	• Demonstrate basic ability to identify and select materials and components for the tasks
		• Demonstrate satisfactory ability to identify and select test equipment to check circuitry	• Demonstrate basic ability to identify and select test equipment to check circuitry

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Drawings and diagrams**	• Demonstrate an excellent ability to read and interpret drawings and diagrams	• Demonstrate a very good ability to read and interpret drawings and diagrams	• Demonstrate a good ability to read and interpret drawings and diagrams
	Circuit construction	• Demonstrate an excellent ability to cut and prepare cables or wires to suit the circuit layout	• Demonstrate a very good ability to cut and prepare cables or wires to suit the circuit layout	• Demonstrate a good ability to cut and prepare cables or wires to suit the circuit layout
		• Demonstrate an excellent ability to attach cables or wires to circuit boards to complete circuitry	• Demonstrate a very good ability to attach cables or wires to circuit boards to complete circuitry	• Demonstrate a good ability to attach cables or wires to circuit boards to complete circuitry
	Components	• Demonstrate an excellent ability to attach components to circuit boards by following a drawing or diagram	• Demonstrate a very good ability to attach components to circuit boards by following a drawing or diagram	• Demonstrate a good ability to attach components to circuit boards by following a drawing or diagram
	Secure cables	• Demonstrate an excellent ability to trim and fit cable ends to component terminals	• Demonstrate a very good ability to trim and fit cable ends to component terminals	• Demonstrate a good ability to trim and fit cable ends to component terminals
	Terminal connections	• Demonstrate an excellent ability to visually inspect circuitry for completeness and correctness	• Demonstrate a very good ability to visually inspect circuitry for completeness and correctness	• Demonstrate a good ability to visually inspect circuitry for completeness and correctness
	Test circuit to be fit for purpose	• Demonstrate an excellent ability to check circuit safety and correctness	• Demonstrate a very good ability to check circuit safety and correctness	• Demonstrate a good ability to check circuit safety and correctness
		• Demonstrate an excellent ability to make any necessary adjustments to correct errors	• Demonstrate a very good ability to make any necessary adjustments to correct errors	• Demonstrate a good ability to make any necessary adjustments to correct errors

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Drawings and diagrams**	• Demonstrate a satisfactory ability to read and interpret drawings and diagrams	• Demonstrate a basic ability to read and interpret drawings and diagrams
	Circuit construction	• Demonstrate a satisfactory ability to cut and prepare cables or wires to suit the circuit layout	• Demonstrate a basic ability to cut and prepare cables or wires to suit the circuit layout
		• Demonstrate a satisfactory ability to attach cables or wires to circuit boards to complete circuitry	• Demonstrate a basic ability to attach cables or wires to circuit boards to complete circuitry
	Components	• Demonstrate a satisfactory ability to attach components to circuit boards, by following a drawing or diagram	• Demonstrate a basic ability to attach components to circuit boards, by following a drawing or diagram
	Secure cables	• Demonstrate a satisfactory ability to trim and fit cable ends to component terminals	• Demonstrate a basic ability to trim and fit cable ends to component terminals
	Terminal connections	• Demonstrate a satisfactory ability to visually inspect circuitry for completeness and correctness	• Demonstrate a basic ability to visually inspect circuitry for completeness and correctness
	Test circuit to be fit for purpose	• Demonstrate a satisfactory ability to check circuit safety and correctness	• Demonstrate a basic ability to check circuit safety and correctness
		• Demonstrate a satisfactory ability to make any necessary adjustments to correct errors	• Demonstrate a basic ability to make any necessary adjustments to correct errors

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	**Task evaluation**	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	**Task evaluation**	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Drawings and diagrams						
Circuit construction						
Components						
Secure cables						
Terminal connections						
Test circuit to be fit for purpose						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Maintenance of Land-Based Machinery

UNIT 41

This unit is based on the learner developing skills in the maintenance of tractors and/or other horticulture or land-based machinery. Learners will have the opportunity to carry out routine safety checks, preparation for operation, routine maintenance and servicing of diesel engines or small petrol engines used for horticulture maintenance.

This unit includes:

- consideration of career opportunities available within agriculture or horticulture machinery maintenance;
- consideration of health and safety issues relating to tractors and other relevant machines;
- consideration of environmental issues relating to working with diesel engines or small petrol engines;
- use of tools and equipment relating to the maintenance of engines;
- the option of either:
  - operating a land-based machine in a safe manner under supervision and within the confines of a controlled environment;

or

  - carrying out basic non-mechanical maintenance on a tractor or other horticulture or land-based machine and attachments; and
- a review and evaluation of performance.

UNIT 41

Maintenance of Land-Based Machinery

Learning Outcomes

Section 1 Preparation and Routine Safety Checks

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA) 1974 in relation to this occupational area;
- understand the current health and safety legislation in relation to tractors and/or other horticulture or land-based machines;
- select appropriate Personal Protective Equipment (PPE), for example safety boots or boiler suit;
- identify the principal components of a tractor or other horticulture or land-based machines;
- carry out daily or weekly checks including environmental checks (oil leaks);
- carry out daily pre-start checks;
- describe the function of tyres, wheels, tracks, steering and brakes;
- describe three career opportunities available within a maintenance workshop; and
- evaluate their own performance in practical tasks.

Section 2 Basic Maintenance of Diesel Engines or Small Petrol Engines

Learners should be able to:

- understand the cycle of a diesel engine;
- use specialist vocabulary relating to diesel engines or small petrol engines;
- understand the use of tools and equipment relating to engines and the specific tasks for which each would be used (examples include spanners, socket sets, levers, screwdrivers, pliers and clamps);
- understand the function of the fuel, cooling and lubrication systems and be able to check for appropriate levels making adjustments where necessary;
- understand the function of transmission, hydraulic or electrical systems;
- carry out an oil change on either a diesel or small petrol engine;
- dispose of waste products and materials in an environmentally friendly manner; and
- evaluate their own performance in practical tasks.

Section 3 Non-Mechanical Maintenance on a Tractor or other Horticulture or Land-Based Machine and Attachments

Learners should be able to:

- identify non-mechanical maintenance requirements;
- cut out damaged section of metal or dismantle as necessary;
- use appropriate tools and equipment;
- manufacture the required part/component as necessary;
- prime metal to protect from corrosion;
- replace identified part/component as necessary;
- recycle or dispose of waste products in an environmentally friendly way; and
- evaluate their own performance in practical tasks.

Section 4 Safe Operation of a Tractor or other Land-Based Machine and Attachments

Learners should be able to:

- check the immediate work area for hazards and take appropriate action as necessary;
- check and adjust operator environment to meet personal requirements;
- mount/dismount the tractor or land-based machine safely;
- operate tractors or other land-based machinery in accordance with current health and safety legislation in various weather conditions;
- evaluate their own performance in practical tasks; and
- carry out an end-of-unit evaluation.

UNIT 41

Maintenance of Land-Based Machinery

Assessment Guidance

Learning evidence can be obtained by using photographs, video recordings or witness statements of practical tasks.

Learners should work individually and identify safety hazards when working with tractors or other horticulture or land-based machinery. Learners should also be able to carry out basic mechanical plant maintenance.

Learners should:

- carry out basic manufacturing processes to provide maintenance on tractors or other horticulture or land-based machinery attachments which includes the use of basic engineering hand tools;

or

- safely operate tractors or other land-based machinery in a controlled environment under teacher/lecturer supervision.

Learners should have access to a suitable tractor or other horticulture or land-based machine and attachments. This is a highly practical unit which encourages learners to combine diesel maintenance skills with basic plant operational skills. Small petrol engines such as those on lawnmowers may be used instead.

Learners should be aware of the health and safety issues associated with the maintenance of diesel plant engines, small petrol engines and basic operative skills.

Learners would benefit from visits to mechanical plant manufacturers, agricultural dealers, auctions or shows. Access to some industry standard equipment and workshops is essential to achieve a high quality learner experience.

Centres delivering this unit should be suitably resourced with:

- multiple small petrol engines; or
- at least two diesel engines or have access to them.

Section 3 requires appropriate hand tools and metal working equipment. Section 4 requires at least one tractor.

One assessment task, as outlined in the example below, could provide evidence for this unit. This example is for Section 3.

Exemplar Assessment

Carry out non-mechanical maintenance to a grass topper.

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- assess maintenance requirements of the damaged area of the metal covering caused by rust;
- cut out damaged area and recycle or dispose of appropriately;
- fold new metal covering as required;
- prime new material with suitable paint;
- secure new metal patch to damaged area in the most efficient way;
- paint to match in with grass topper's original colour;
- tidy up work areas and return tools;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Maintenance of Land-Based Machinery

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate an excellent understanding of the potential hazards and pre-start checks that can exist when working with horticulture or land-based machinery	• Demonstrate a very good understanding of the potential hazards and pre-start checks that can exist when working with horticulture or land-based machinery	• Demonstrate a good understanding of the potential hazards and pre-start checks that can exist when working with horticulture or land-based machinery
		• Demonstrate an excellent understanding of career opportunities	• Demonstrate a very good understanding of career opportunities	• Demonstrate a good understanding of career opportunities
		• Demonstrate excellent understanding of environmental issues such as procedures for dealing with oil leaks and disposing of waste products and materials	• Demonstrate very good understanding of environmental issues such as procedures for dealing with oil leaks and disposing of waste products and materials	• Demonstrate good understanding of environmental issues such as procedures for dealing with oil leaks and disposing of waste products and materials
	Materials and related skills and knowledge	• Demonstrate excellent ability to identify the basic principles of diesel or petrol engines using specialist vocabulary	• Demonstrate very good ability to identify the basic principles of diesel or petrol engines using specialist vocabulary	• Demonstrate good ability to identify the basic principles of diesel or petrol engines using specialist vocabulary

UNIT 41

Maintenance of Land-Based Machinery

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate a satisfactory understanding of the potential hazards and pre-start checks that can exist when working with horticulture or land-based machinery	• Demonstrate a basic understanding of the potential hazards and pre-start checks that can exist when working with horticulture or land-based machinery
		• Demonstrate a satisfactory understanding of career opportunities	• Demonstrate a basic understanding of career opportunities
		• Demonstrate satisfactory understanding of environmental issues such as procedures for dealing with oil leaks and disposing of waste products and materials	• Demonstrate basic understanding of environmental issues such as procedures for dealing with oil leaks and disposing of waste products and materials
	Materials and related skills and knowledge	• Demonstrate satisfactory ability to identify the basic principles of diesel or petrol engines using specialist vocabulary	• Demonstrate basic ability to identify the basic principles of diesel or petrol engines using specialist vocabulary

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Tools and equipment**	• Demonstrate excellent use of tools and equipment when maintaining horticulture or land-based machinery	• Demonstrate very good use of tools and equipment when maintaining horticulture or land-based machinery	• Demonstrate good use of tools and equipment when maintaining horticulture or land-based machinery
	Fuel, cooling and lubrication	• Demonstrate excellent ability to check and adjust fuel, cooling and lubrication systems	• Demonstrate very good ability to check and adjust fuel, cooling and lubrication systems	• Demonstrate good ability to check and adjust fuel, cooling and lubrication systems
	Transmission, hydraulics or electric systems	• Demonstrate excellent ability to check transmission, hydraulic or electric systems	• Demonstrate very good ability to check transmission, hydraulic or electric systems	• Demonstrate good ability to check transmission, hydraulic or electric systems
	Oil change	• Demonstrate excellent ability to carry out an oil change	• Demonstrate very good ability to carry out an oil change	• Demonstrate good ability to carry out an oil change
	Learners will undertake either Section 3 or Section 4 below.			
	Section 3			
	Tools and equipment	• Demonstrate excellent use of tools and equipment for non-mechanical maintenance	• Demonstrate very good use of tools and equipment for non-mechanical maintenance	• Demonstrate good use of tools and equipment for non-mechanical maintenance
	Non-mechanical maintenance	• Demonstrate excellent ability to manufacture and install or replace parts/components as necessary	• Demonstrate very good ability to manufacture and install or replace parts/components as necessary	• Demonstrate good ability to manufacture and install or replace parts/components as necessary
	Section 4			
	Tractor operation hazards	• Demonstrate excellent ability to identify driving hazards	• Demonstrate very good ability to identify driving hazards	• Demonstrate good ability to identify driving hazards
	Tractor operation	• Demonstrate excellent ability to operate a tractor or other land-based machinery within a controlled environment	• Demonstrate very good ability to operate a tractor or other land-based machinery within a controlled environment	• Demonstrate good ability to operate a tractor or other land-based machinery within a controlled environment

Maintenance of Land-Based Machinery

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Tools and equipment**	• Demonstrate satisfactory use of tools and equipment when maintaining horticulture or land-based machinery	• Demonstrate basic use of tools and equipment when maintaining horticulture or land-based machinery
	Fuel, cooling and lubrication	• Demonstrate satisfactory ability to check fuel, cooling and lubrication systems, displaying an excellent level of understanding	• Demonstrate basic ability to check fuel, cooling and lubrication systems, displaying an excellent level of understanding
	Transmission, hydraulics or electric systems	• Demonstrate satisfactory ability to check transmission, hydraulic or electric systems	• Demonstrate basic ability to check transmission, hydraulic or electric systems
	Oil change	• Demonstrate satisfactory ability to carry out an oil change	• Demonstrate basic ability to carry out an oil change
	Learners will undertake either Section 3 or Section 4 below.		
	Section 3		
	Tools and equipment	• Use tools and equipment for non-mechanical maintenance displaying a satisfactory level of understanding	• Use tools and equipment for non-mechanical maintenance displaying a basic level of understanding
	Non-mechanical maintenance	• Demonstrate ability to manufacture and install or replace as necessary displaying a satisfactory level of understanding	• Demonstrate ability to manufacture and install or replace as necessary displaying a basic level of understanding
	Section 4		
	Tractor operation hazards	• Demonstrate satisfactory ability to identify driving hazards	• Demonstrate basic ability to identify driving hazards
	Tractor operation	• Demonstrate satisfactory ability to operate a tractor or other land-based machinery within a controlled environment	• Demonstrate basic ability to operate a tractor or other land-based machinery within a controlled environment

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	**Task evaluation**	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	**Task evaluation**	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

UNIT 41

Maintenance of Land-Based Machinery

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Tools and equipment						
Fuel, cooling and lubrication						
Transmission, hydraulics or electric systems						
Oil change						
Mark as appropriate for either Section 3 or Section 4.						
Section 3: Tools and equipment						
Section 3: Non-mechanical maintenance						
Section 4: Tractor operation hazards						
Section 4: Tractor operation						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Manufacturing Techniques – Hand Fitting

UNIT 42

This unit is designed to give the learner a basic understanding of the practical skills and basic knowledge required in the production of assembled components manufactured from metal.

This unit includes:

- consideration of health and safety issues within the unit;
- consideration of career opportunities available within engineering and/or manufacturing;
- consideration of environmental issues relating to the sourcing of raw materials, manufacture and recycling within the unit;
- selection and use of appropriate hand tools and measuring equipment;
- development of the techniques of measuring, cutting, filing, drilling and threading component parts;
- the use of equipment, for example scriber, punch, dividers and odd-legs to mark out component profiles;
- the manufacture of various parts for assembly to make a finished component;
- the use of measuring equipment, for example ruler, vernier calipers or micrometer, to check sizes of parts;
- joining parts together using rivets and screw threads; and
- a review and evaluation of performance.

UNIT 42

Manufacturing Techniques – Hand Fitting

Learning Outcomes

Section 1 Health and Safety Procedures, Careers, the Environment and Good Housekeeping

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA) 1974 in relation to this occupational area;
- understand workshop procedures in the event of a fire or accident;
- identify and use appropriate Personal Protective Equipment (PPE) for example safety boots, safety glasses and boiler suit or apron;
- describe three career opportunities within engineering and/or manufacturing;
- demonstrate an understanding of environmental issues relating to the sourcing of raw materials, resources used in manufacture and recycling;
- apply safe working practices in the workshop in the use of sharp and pointed tools;
- select and inspect tools and equipment ensuring they are safe and fit for use;
- store tools and materials safely and ensure a safe and tidy work area; and
- evaluate their own performance in practical tasks.

Section 2 Selection of Tools and Equipment

Learners should be able to:

- wear appropriate PPE and observe all health and safety procedures in the workshop;
- read and interpret simple engineering drawings;
- show an understanding of the sequence in which the manufacturing operations are carried out;
- ensure the workshop area is clear of any obstacles, surplus materials or potential hazards;
- select the correct materials and tools from instructions/information given;
- inspect tools and equipment for wear or damage and report any faults to supervisor;
- mark out lined detail on metal components using marking out and measuring equipment (for example ruler, square and scriber);
- mark out drilled hole positions, centre lines and centre punch;
- follow demonstrations/instructions on setting up and using drilling machine;
- drill holes of correct diameter according to a pattern or drawing;
- tap holes to provide internal threads;
- cut accurately on waste side of line and file to profile/shape;
- check finished components for accuracy using rulers, squares or protectors;
- check own work and agree remedial action with supervisor if issues arise at assembly stage;
- reinstate the work area on completion of task and dispose of waste materials appropriately; and
- evaluate their own performance in practical tasks.

Learning Outcomes (cont.)

Section 3 Manufacture, Assemble, Test and Inspect Assembled Tasks

Learners should be able to:

- read and understand simple engineering drawings and interpret the dimensional information relating to shapes such as square edges, angular detail, internal and external radii, drilled and tapped holes, reaming and counterboring;
- use the necessary instrument to mark out accurately the features of the component being manufactured;
- use the necessary hand tools to cut out the profiles of the component;
- use pedestal drilling machine by adjusting table height, securing work piece, selecting and securing cutting tool (drill, reamer, countersink and counterbore) selecting speed and setting guard to drill specific hole sizes;
- drill through holes and blind holes to specific depths and ream to fit;
- assemble component and inspect for accuracy;
- agree any changes with supervisor and carry out any alterations or remedial action required to correct and complete the task;
- produce the components with the necessary range of profiles that allow the assembly of the mating parts to fit together with the correct orientation and matching holes for screws, bolts, dowels and rivets to complete the assembly;
- check the quality and accuracy of the manufactured components at various stages using a range of measuring and checking tools;
- evaluate their own performance in practical tasks; and
- carry out an end-of-unit evaluation.

UNIT 42

Manufacturing Techniques – Hand Fitting

Assessment Guidance

Teachers/Lecturers should explain the importance of a safe working environment and a clean and tidy work area.

Learners should demonstrate a working knowledge of the various stages in the production of assembled components manufactured from metal.

Practical occupational tasks selected should reflect the breadth of opportunity for learners to be stretched and challenged when demonstrating their skills in line with this unit.

Centres delivering this unit should be suitably resourced with multiple hand tools, consumable metal of appropriate section, drilling, cutting and finishing equipment and appropriate tools for cutting threads where necessary.

The following assessment task could provide evidence for the unit requirements.

Exemplar Assessment

Manufacture an engineer's cramp.

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- select suitable workshop area and identify and select tools as necessary;
- interpret drawings;
- identify materials required for assembly, measure material size;
- produce datums and file to correct dimensions;
- mark out profiles as per drawing;
- manufacture according to drawings including drilling, filing and cutting, as necessary;
- tap threads, drill, counterbore and ream designated holes as required;
- test operation of assembled parts and adjust/modify as necessary;
- check completed component against specification;
- tidy work area, return all tools and equipment and dispose of surplus materials in an environmentally friendly manner;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Manufacturing Techniques - Hand Fitting

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate excellent understanding of the requirements of health and safety procedures when using tools and equipment • Demonstrate excellent ability to comply with workshop rules in the event of fire or accident • Demonstrate excellent understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way • Provide an excellent description of three related career opportunities	• Demonstrate very good understanding of the requirements of health and safety procedures when using tools and equipment • Demonstrate very good ability to comply with workshop rules in the event of fire or accident • Demonstrate very good understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way • Provide a very good description of three related career opportunities	• Demonstrate good understanding of the requirements of health and safety procedures when using tools and equipment • Demonstrate good ability to comply with workshop rules in the event of fire or accident • Demonstrate good understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way • Provide a good description of three related career opportunities
	Materials and related skills and knowledge	• Demonstrate excellent ability to identify and select materials, tools and equipment for the tasks • Demonstrate excellent ability to identify and select measuring equipment to check accuracy	• Demonstrate very good ability to identify and select materials, tools and equipment for the tasks • Demonstrate very good ability to identify and select measuring equipment to check accuracy	• Demonstrate good ability to identify and select materials, tools and equipment for the tasks • Demonstrate very good ability to identify and select measuring equipment to check accuracy

UNIT 42

Manufacturing Techniques – Hand Fitting

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate satisfactory understanding of the requirements of health and safety procedures when using tools and equipment • Demonstrate satisfactory ability to comply with workshop rules in the event of fire or accident • Demonstrate satisfactory understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way • Provide a satisfactory description of three related career opportunities	• Demonstrate basic understanding of the requirements of health and safety procedures when using tools and equipment • Demonstrate basic ability to comply with workshop rules in the event of fire or accident • Demonstrate basic understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way • Provide a basic description of three related career opportunities
	Materials and related skills and knowledge	• Demonstrate satisfactory ability to identify and select materials, tools and equipment for the tasks • Demonstrate satisfactory ability to identify and select measuring equipment to check accuracy	• Demonstrate basic ability to identify and select materials, tools and equipment for the tasks • Demonstrate basic ability to identify and select measuring equipment to check accuracy

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Drawings and marking out**	• Demonstrate excellent ability to read and understand drawings and diagrammatic guidelines	• Demonstrate very good ability to read and understand drawings and diagrammatic guidelines	• Demonstrate good ability to read and understand drawings and diagrammatic guidelines
		• Demonstrate excellent ability to mark out features of the components	• Demonstrate very good ability to mark out features of the component	• Demonstrate good ability to mark out features of the components
	Cutting and preparation	• Demonstrate excellent ability to cut and prepare material for individual parts/components as per drawing/diagrams	• Demonstrate very good ability to cut and prepare material for individual parts/components as per drawing/diagrams	• Demonstrate good ability to cut and prepare material for individual parts/components as per drawing/diagrams
	Assemble components	• Demonstrate excellent ability to manufacture individual parts for complete assembly	• Demonstrate very good ability to manufacture individual parts for complete assembly	• Demonstrate good ability to manufacture individual parts for complete assembly
	Use of hand tools	• Demonstrate excellent ability to use hand tools to carry out a range of tasks, for example sawing, filing, chiselling, scribing, centre-punching, riveting, and thread-tapping	• Demonstrate very good ability to use hand tools to carry out a range of tasks, for example sawing, filing, chiselling, scribing, centre-punching, riveting, and thread-tapping	• Demonstrate good ability to use hand tools to carry out a range of tasks, for example sawing, filing, chiselling, scribing, centre-punching, riveting, and thread-tapping
	Use of machine tools	• Demonstrate excellent ability to use machine tools to carry out a range of tasks, for example drilling, reaming, counterboring and countersinking	• Demonstrate very good ability to use machine tools to carry out a range of tasks, for example drilling, reaming, counterboring and countersinking	• Demonstrate good ability to use machine tools to carry out a range of tasks, for example drilling, reaming, counterboring and countersinking
	Measure and check accuracy	• Demonstrate excellent ability to use measuring equipment to check accuracy of individual and assembled parts	• Demonstrate very good ability to use measuring equipment to check accuracy of individual and assembled parts	• Demonstrate good ability to use measuring equipment to check accuracy of individual and assembled parts
		• Demonstrate excellent ability to make any necessary adjustments to correct errors	• Demonstrate very good ability to make any necessary adjustments to correct errors	• Demonstrate good ability to make any necessary adjustments to correct errors

Manufacturing Techniques – Hand Fitting

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Drawings and marking out**	• Demonstrate satisfactory ability to read and understand drawings and diagrammatic guidelines	• Demonstrate basic ability to read and understand drawings and diagrammatic guidelines
		• Demonstrate satisfactory ability to mark out features of the components	• Demonstrate basic ability to mark out features of the components
	Cutting and preparation	• Demonstrate satisfactory ability to cut and prepare material for individual parts/components as per drawing/diagrams	• Demonstrate basic ability to cut and prepare material for individual parts/components as per drawing/diagrams
	Assemble components	• Demonstrate satisfactory ability to manufacture individual parts for complete assembly	• Demonstrate basic ability to manufacture individual parts for complete assembly
	Use of hand tools	• Demonstrate satisfactory ability to use hand tools to carry out a range of tasks, for example sawing, filing, chiselling, scribing, centre-punching, riveting, and thread-tapping	• Demonstrate basic ability to use hand tools to carry out a range of tasks, for example sawing, filing, chiselling, scribing, centre-punching, riveting, and thread-tapping
	Use of machine tools	• Demonstrate satisfactory ability to use machine tools to carry out a range of tasks, for example drilling, reaming, counterboring and countersinking	• Demonstrate basic ability to use machine tools to carry out a range of tasks, for example drilling, reaming, counterboring and countersinking
	Measure and check accuracy	• Demonstrate satisfactory ability to use measuring equipment to check accuracy of individual and assembled parts	• Demonstrate basic ability to use measuring equipment to check accuracy of individual and assembled parts
		• Demonstrate satisfactory ability to make any necessary adjustments to correct errors	• Demonstrate basic ability to make any necessary adjustments to correct errors

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	**Task evaluation**	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	**Task evaluation**	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

Manufacturing Techniques – Hand Fitting

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Drawings and marking out						
Cutting and preparation						
Assemble components						
Use of hand tools						
Use of machine tools						
Measure and check accuracy						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Manufacturing Techniques – Sheet Metal

UNIT 43

This unit is designed to give the learner a basic understanding of the practical skills and basic knowledge required in the fabrication of assembled components manufactured from sheet metal. The learner will gain experience and an opportunity to demonstrate the ability to cut, form and join sheet metal to fabricate simple items.

This unit includes:

- consideration of health and safety issues within the unit;
- consideration of the career opportunities available within engineering fabrication;
- consideration of environmental issues relating to the sourcing of raw materials, manufacture and recycling within the unit;
- selection and use of appropriate marking out equipment and hand tools;
- development of the techniques of measuring, marking out, cutting, folding and joining together component parts to produce an assembled item;
- the use of equipment, for example scriber, punch, divider or calipers, to mark out component profiles;
- assembly of various parts to make a finished component;
- joining parts together using rivets, hinges and welding; and
- a review and evaluation of performance.

UNIT 43

Manufacturing Techniques – Sheet Metal

Learning Outcomes

Section 1 Health and Safety Procedures, Careers and Good Housekeeping

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA) 1974 in relation to this occupational area;
- understand workshop procedures in the event of a fire or accident;
- identify and use appropriate Personal Protective Equipment (PPE), for example safety boots, gloves, safety glasses and boiler suit or apron;
- apply safe working practice in the handling of sheet metal sections;
- apply safe working practices in the workshop in the use of sharp and pointed tools, for example scribers, dividers, or off-legs;
- describe three career opportunities available within engineering fabrication;
- select and inspect tools and equipment ensuring they are safe and fit for use;
- store tools and materials safely and ensure a safe and tidy work area;
- demonstrate an understanding of environmental issues relating to the sourcing of raw materials and resources used in manufacture and recycling; and
- evaluate their own performance in practical tasks.

Section 2 The Use of Basic Tools and Equipment

Learners should be able to:

- wear appropriate PPE and observe all health and safety procedures in the workshop;
- read and interpret simple engineering drawings;
- show an understanding of the sequence in which the manufacturing operations are carried out;
- select the correct materials and tools from instruction/information given;
- inspect tools and equipment for wear or damage and report any faults to supervisor;
- mark out lined detail on metal components using marking out and measuring equipment (for example ruler, square, scriber, calipers and dividers);
- mark out positions for drilling holes using centre lines and centre punch;
- follow demonstrations/instructions on setting up and using hole punch and drilling machine;
- drill/punch holes of correct diameter according to engineering drawings;
- recycle all cuttings;
- cut accurately to line and file/de-burr to profile/shape;
- check finished components for accuracy using rules and gauges;
- check own work and agree remedial action with supervisor if issues arise at assembly stage;
- ensure the workshop area is clear of any obstacles, surplus materials or potential hazards;
- reinstate the work area on completion of task and dispose of waste materials appropriately; and
- evaluate their own performance in practical tasks.

Section 3 Manufacture, Measure and Inspect Assembled Tasks

Learners should be able to:

- read and understand simple engineering drawings and interpret the dimensional information relating to shapes such as square edges, angular detail, internal and external radii, safe edges and drilled holes;
- use the necessary instruments to mark out accurately the features of the component being manufactured;
- use the necessary hand tools to cut out the profiles of the component;
- use pedestal drilling machine by adjusting table height, securing work piece, selecting and securing cutting tool, selecting speed and setting guard to drill a hole;
- form sheet metal using hand and machine tools in accordance with approved procedures;
- assemble the components with the necessary range of profiles that allow the mating parts to fit together with the correct orientation and matching holes for rivets;
- inspect for accuracy and agree any remedial action with supervisor;
- carry out any alterations or remedial action required to correct and complete the task;
- check the quality and accuracy of the manufactured components at various stages using measuring and checking tools;
- evaluate their own performance in practical tasks; and
- carry out an end-of-unit evaluation.

UNIT 43

Manufacturing Techniques – Sheet Metal

Assessment Guidance

Teachers/Lecturers should explain the importance of a safe working environment and a clean and tidy work area.

Learners should demonstrate a working knowledge of the various stages in the production of assembled components manufactured from metal.

Practical occupational tasks selected should reflect the breadth of opportunity for learners to be stretched and challenged when demonstrating their skills in line with this unit.

Centres delivering this unit should be suitably resourced with multiple hand tools, consumable sheet metal, and cutting, folding, riveting, welding and drilling equipment.

The following assessment task could provide evidence for the unit requirements.

Exemplar Assessment

Manufacture a tool box or post box.

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- select suitable workshop area and identify and select tools as necessary;
- interpret drawings;
- identify materials required for development and measure and cut to size;
- manufacture assessment task;
- assemble and secure parts;
- test operation of assembled parts and adjust/modify as necessary;
- check completed item against specification;
- tidy work area and return all tools and equipment and dispose of surplus material;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Manufacturing Techniques – Sheet Metal

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate excellent understanding of the requirements of health and safety procedures when using tools and equipment • Demonstrate excellent ability to comply with workshop rules in the event of fire or accident • Demonstrate excellent understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way • Provide an excellent description of three career opportunities	• Demonstrate very good understanding of the requirements of health and safety procedures when using tools and equipment • Demonstrate very good ability to comply with workshop rules in the event of fire or accident • Demonstrate very good understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way • Provide a very good description of three career opportunities	• Demonstrate good understanding of the requirements of health and safety procedures when using tools and equipment • Demonstrate good ability to comply with workshop rules in the event of fire or accident • Demonstrate good understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way • Provide a good description of three career opportunities
	Materials and related skills and knowledge	• Demonstrate excellent ability to identify and select materials, tools and components for the tasks • Demonstrate excellent evidence of identifying and selecting measuring equipment to check accuracy	• Demonstrate very good ability to identify and select materials, tools and components for the tasks • Demonstrate very good evidence of identifying and selecting measuring equipment to check accuracy	• Demonstrate good ability to identify and select materials, tools and components for the tasks • Demonstrate very good evidence of identifying and selecting measuring equipment to check accuracy

Manufacturing Techniques – Sheet Metal

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate satisfactory understanding of the requirements of health and safety procedures when using tools and equipment	• Demonstrate basic understanding of the requirements of health and safety procedures when using tools and equipment
		• Demonstrate satisfactory ability to comply with workshop rules in the event of fire or accident	• Demonstrate basic ability to comply with workshop rules in the event of fire or accident
		• Demonstrate satisfactory understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way	• Demonstrate basic understanding of the importance of leaving the workshop tidy and safe, and by recycling waste or disposing of it in an environmentally friendly way
		• Provide a satisfactory description of three career opportunities	• Provide a basic description of three career opportunities
	Materials and related skills and knowledge	• Demonstrate satisfactory ability to identify and select materials, tools and components for the tasks	• Demonstrate basic ability to identify and select materials, tools and components for the tasks
		• Demonstrate satisfactory evidence of identifying and selecting measuring equipment to check accuracy	• Demonstrate basic evidence of identifying and selecting measuring equipment to check accuracy

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Drawings and marking out**	• Demonstrate an excellent ability to read and understand drawings and diagrammatic guidelines	• Demonstrate a very good ability to read and understand drawings and diagrammatic guidelines	• Demonstrate a good ability to read and understand drawings and diagrammatic guidelines
	Cutting and preparation	• Demonstrate an excellent ability to mark out details on components • Demonstrate an excellent ability to cut and prepare material for individual parts/ components as per drawing/diagram	• Demonstrate a very good ability to mark out details on components • Demonstrate a very good ability to cut and prepare material for individual parts/ components as per drawing/diagram	• Demonstrate a good ability to mark out details on components • Demonstrate a good ability to cut and prepare material for individual parts/components as per drawing/diagram
	Assemble components	• Demonstrate an excellent ability to manufacture individual parts for complete assembly	• Demonstrate a very good ability to manufacture individual parts for complete assembly	• Demonstrate a good ability to manufacture individual parts for complete assembly
	Use of hand tools	• Demonstrate an excellent ability to use hand tools, for example guillotine, hacksaw, file, chisel, scribe, centre-punch and drill	• Demonstrate a very good ability to use hand tools, for example guillotine, hacksaw, file, chisel, scribe, centre-punch and drill	• Demonstrate a good ability to use hand tools, for example guillotine, hacksaw, file, chisel, scribe, centre-punch and drill
	Use of machine tools	• Demonstrate an excellent ability to use machine tools to carry out a range of tasks, for example drilling and countersinking	• Demonstrate a very good ability to use machine tools to carry out a range of tasks, for example drilling and countersinking	• Demonstrate a good ability to use machine tools to carry out a range of tasks, for example drilling and countersinking
	Measure and check accuracy	• Demonstrate an excellent ability to use measuring equipment to check accuracy of individual and assembled parts • Demonstrate an excellent ability to make any necessary adjustments to correct errors	• Demonstrate a very good ability to use measuring equipment to check accuracy of individual and assembled parts • Demonstrate a very good ability to make any necessary adjustments to correct errors	• Demonstrate a good ability to use measuring equipment to check accuracy of individual and assembled parts • Demonstrate a good ability to make any necessary adjustments to correct errors

Manufacturing Techniques – Sheet Metal

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Drawings and marking out**	• Demonstrate a satisfactory ability to read and understand drawings and diagrammatic guidelines	• Demonstrate a basic ability to read and understand drawings and diagrammatic guidelines
	Cutting and preparation	• Demonstrate a satisfactory ability to mark out details on components • Demonstrate a satisfactory ability to cut and prepare material for individual parts/components as per drawing/diagram	• Demonstrate a basic ability to mark out details on components • Demonstrate a basic ability to cut and prepare material for individual parts/components as per drawing/diagram
	Assemble components	• Demonstrate a satisfactory ability to manufacture individual parts for complete assembly	• Demonstrate a basic ability to manufacture individual parts for complete assembly
	Use of hand tools	• Demonstrate a satisfactory ability to use hand tools, for example guillotine, hacksaw, file, chisel, scribe, centre-punch and drill	• Demonstrate a basic ability to use hand tools, for example guillotine, hacksaw, file, chisel, scribe, centre-punch and drill
	Use of machine tools	• Demonstrate a satisfactory ability to use machine tools to carry out a range of tasks, for example drilling and countersinking	• Demonstrate a basic ability to use machine tools to carry out a range of tasks, for example drilling and countersinking
	Measure and check accuracy	• Demonstrate a satisfactory ability to use measuring equipment to check accuracy of individual and assembled parts • Demonstrate a satisfactory ability to make any necessary adjustments to correct errors	• Demonstrate a basic ability to use measuring equipment to check accuracy of individual and assembled parts • Demonstrate a basic ability to make any necessary adjustments to correct errors

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	**Task evaluation**	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	**Task evaluation**	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

Manufacturing Techniques – Sheet Metal

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Drawings and marking out						
Cutting and preparation						
Assemble components						
Use of hand tools						
Use of machine tools						
Measure and check accuracy						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Plumbing

UNIT 44

This unit is designed to develop skills in plumbing and associated activities.

This unit includes:

- consideration of health and safety issues in relation to workshop activities;
- consideration of career opportunities in building services;
- the appropriate use of plumbing hand tools;
- the use of industrial standard materials and sustainable resourcing of these materials;
- the cutting and bending of copper pipework;
- jointing methods for copper and mild steel pipe;
- the use of a hand-held threading machine for mild steel pipe;
- cutting, bending and jointing methods for polybutylene pipe;
- consideration of environmental issues in relation to workshop activities; and
- a review and evaluation of performance.

UNIT 44

Plumbing

Learning Outcomes

Section 1 Health and Safety including Safety Relating to the use of Hand Tools

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA)1974 in relation to this occupational area;
- wear appropriate Personal Protective Equipment (PPE), for example safety boots, gloves or goggles;
- understand appropriate methods of handling materials and the safety aspects of a floor-standing bending machine;
- describe three career opportunities in building services;
- use a senior hacksaw safely and correctly;
- understand safe procedures for manual lifting, including individual and team lifting;
- follow correct accident procedures should an incident occur in the workshop;
- identify and name the parts of the following basic hand tools:
  - a measuring tape;
  - drawing board;
  - rule for marking out drawing exercise;
  - copper pipe cutters;
  - senior hacksaw;
  - plumber's set square;
  - slides used with a copper bending machine;
  - floor-standing bending machine;
  - pipe cutters for mild steel pipe; and
  - a hand threader; and
- evaluate their own performance in practical tasks.

Section 2 Cutting and Bending Copper, Polybutylene and Mild Steel Pipe

Learners should be able to:

- cut copper pipe to given dimensions with a minimum of waste;
- interpret drawings;
- bend an offset and a double square bend in copper pipework;
- bend a pipe allowing for 'spring back' using a hydraulic bending machine and cut threads;
- cut a mild steel pipe to given dimensions with a senior hacksaw with a minimum of waste;
- recycle or dispose of waste in an environmentally friendly manner; and
- evaluate their own performance in practical tasks.

Section 3 Jointing Methods for Copper, Polybutylene and Mild Steel Pipe

Learners should be able to:

- join pipe using the following methods:
  - compression fittings;
  - push fittings;
  - capillary fittings;
  - soldering; and
  - brazing;
- pressure test the assembled pipework for 10 minutes using hand pressure-testing equipment to 3 bar;
- use a gas leak detector to identify any leaks;
- join mild steel pipe to fittings using flax and paste;
- evaluate their own performance in practical tasks; and
- carry out an end-of-unit evaluation.

Assessment Guidance

Teachers/Lecturers should emphasise the importance of a safe working environment and a clean and tidy work area.

Observation of work activities, examination of work completed and written records are the preferred means of assessment.

Practical occupational tasks selected should reflect the breadth of opportunity for learners to be stretched and challenged when demonstrating their skills in line with this specification.

Three assessments are required, one each for copper, mild steel and polybutylene.

Exemplar Assessment

Install a single radiator using copper pipe.

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- prepare the workshop and select tools;
- print a drawing for the task;
- quantify the materials required and prepare a cutting list;
- mark out the practical activity;
- cut pipe to given dimensions;
- make a double square bend in copper pipe to given dimensions;
- bend an offset in copper pipe to given dimensions;
- join all pipework to complete the task using standard industrial methods;
- tidy up the work area and dispose of waste correctly;
- store and maintain tools in the appropriate manner;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Plumbing

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate excellent understanding of safe working practices and potential hazards that can exist in the plumbing workshop when using hand and power tools	• Demonstrate a very good understanding of safe working practices and potential hazards that can exist in the plumbing workshop when using hand and power tools	• Demonstrate a good understanding of safe working practices and potential hazards that can exist in the plumbing workshop when using hand and power tools
		• Demonstrate excellent understanding of the importance of leaving the workshop tidy and the disposal of waste safely and in an environmentally friendly manner	• Demonstrate very good understanding of the importance of leaving the workshop tidy and the disposal of waste safely and in an environmentally friendly manner	• Demonstrate good understanding of the importance of leaving the workshop tidy and the disposal of waste safely and in an environmentally friendly manner
		• Describe career options in building services to an excellent standard	• Describe career options in building services to a very good standard	• Describe career options in building services to a good standard
	Materials and related skills and knowledge	• Correctly identify in an excellent manner the different types of materials, different types of basic hand tools and their maintenance	• Correctly identify in a very good manner the different types of materials, different types of basic hand tools and their maintenance	• Correctly identify in a good manner the different types of materials, different types of basic hand tools and their maintenance

UNIT 44

Plumbing

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate a satisfactory understanding of potential hazards that can exist in the plumbing workshop when using hand and power tools	• Demonstrate a basic understanding of potential hazards that can exist in the plumbing workshop when using hand and power tools
		• Demonstrate satisfactory understanding of the importance of leaving the workshop tidy and the disposal of waste safely and in an environmentally friendly manner	• Demonstrate basic understanding of the importance of leaving the workshop tidy and the disposal of waste safely and in an environmentally friendly manner
		• Describe career options in building services to a satisfactory standard	• Describe career options in building services to a basic standard
	Materials and related skills and knowledge	• Correctly identify in a satisfactory manner the different types of basic hand tools and their maintenance	• Correctly identify in a basic manner the different types of basic hand tools and their maintenance

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Resources**	• Demonstrate excellent use of resources and waste recycling	• Demonstrate very good use of resources and waste recycling	• Demonstrate good use of resources and waste recycling
	Drawing and cutting list	• Demonstrate excellent ability to interpret the drawing and prepare a cutting list	• Demonstrate very good ability to interpret the drawing and prepare a cutting list	• Demonstrate good ability to interpret the drawing and prepare a cutting list
	Mark out practical activity	• Mark out work in an excellent manner	• Mark out work in a very good manner	• Mark out work in a good manner
	Cutting and bending	• Cut and bend materials to an excellent standard	• Cut and bend materials to a very good standard	• Cut and bend materials to a good standard
	Jointing methods	• Complete joints to an excellent standard using copper, polybutylene and mild steel pipe	• Complete joints to a very good standard using copper, polybutylene and mild steel pipe	• Complete joints to a good standard using copper, polybutylene and mild steel pipe
		• Ensure all pipe work has been jointed to an excellent standard within a tolerance of 1 mm	• Ensure all pipe work has been jointed to a very good standard within a tolerance of 2 mm	• Ensure all pipe work has been jointed to a good standard within a tolerance of 3 mm
	End product	• Produce an end product fit for purpose with an excellent general appearance	• Produce an end product fit for purpose with a very good general appearance	• Produce an end product fit for purpose with a good general appearance

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Resources**	• Demonstrate satisfactory use of resources and waste recycling	• Demonstrate basic use of resources and waste recycling
	Drawing and cutting list	• Demonstrate satisfactory ability to interpret the drawing and prepare a cutting list	• Demonstrate basic ability to interpret the drawing and prepare a cutting list
	Mark out practical activity	• Mark out work in a satisfactory manner	• Mark out work in a basic manner
	Cutting and bending	• Cut and bend materials to a satisfactory standard	• Cut and bend materials to a basic standard
	Jointing methods	• Complete joints to a satisfactory standard using copper, polybutylene and mild steel pipe	• Complete joints to a basic standard using copper, polybutylene and mild steel pipe
		• Ensure all pipe work has been jointed to a satisfactory standard within a tolerance of 4 mm	• Ensure all pipe work has been jointed to a basic standard within a tolerance of 5 mm
	End product	• Produce and end product fit for purpose with a satisfactory general appearance	• Produce and end product fit for purpose with a basic general appearance

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	**Task evaluation**	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	**Task evaluation**	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Resources						
Drawing and cutting list						
Mark out practical activity						
Cutting and bending						
Jointing methods						
End product						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Vehicle Servicing and Valeting Operations

UNIT 45

This unit covers two topics: vehicle servicing and vehicle valeting. Learners will be introduced to the correct procedures for carrying out regular servicing and valeting of vehicles.

This unit is suitable for those who may be interested in pursuing careers as vehicle fitters, motor mechanics or vehicle valeters.

This unit includes:

- consideration of health and safety issues in the motor vehicle workshop;
- using specialist components and materials to carry out vehicle servicing procedures;
- using specialist equipment and cleaning materials to carry out vehicle valeting procedures;
- consideration of careers related to vehicle servicing and valeting;
- consideration of environmental regulations related to vehicle servicing and valeting; and
- a review and evaluation of performance.

UNIT 45

Vehicle Servicing and Valeting Operations

Learning Outcomes

Section 1 Health and Safety, Careers and Environmental Legislation

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA) 1974;
- demonstrate the importance of personal conduct and presentation in maintaining health and safety in the workplace;
- identify health and safety risks in their role and how to avoid these;
- demonstrate how to work in a way that minimises the risk of:
  - damage to vehicle systems;
  - damage to components;
  - contact with leakage; and
  - contact with hazardous substances;
- describe three opportunities for careers related to vehicle servicing and valeting;
- identify and understand the importance of environmental regulations in relation to the safe disposal of waste oils, waste materials and cleaning agents; and
- evaluate their own performance in practical tasks.

Section 2 Terminology, Components and Materials

Learners should be able to:

- identify specialist vocabulary relating to servicing and valeting techniques, components and materials;
- identify the range of different types of vehicle servicing;
- demonstrate how to select and use appropriate information from workshop manuals, technical data books, manufacturers' information sheets and the internet;
- identify and compare part numbers to ensure service replacement components are correct;
- discuss the properties and use of vehicle exterior and interior cleaning materials;
- identify the external and internal cleaning agents used, ensuring they are suitable for the vehicles surfaces and specification;
- demonstrate economical use of all cleaning agents, materials and power supply; and
- evaluate their own performance in practical tasks.

Section 3 Tools and Equipment

Learners should be able to:

- select and use tools and equipment relating to vehicle servicing and valeting techniques, for example spanners, socket sets, wheel braces, screwdrivers, hammers, pliers and self-locking grips, torque wrenches, trolley jacks, axle stands, vehicle hoists, power washer units, buckets, sponges, cloths, chamois and vacuum and upholstery cleaners;
- demonstrate how to ensure that the tools and equipment being used are in a safe working condition and are returned to their correct location after use; and
- evaluate their own performance in practical tasks.

Learning Outcomes (cont.)

Section 4 Practical Tasks

Vehicle Servicing

Learners should be able to:

- demonstrate how to fit protection covers to a vehicle;
- demonstrate how to carry out a vehicle service including: different types of wheels, engine oil and filter, air filters, fuel filters (petrol or diesel), spark plugs, alternator belt, hoses, coolant, brake lining and lighting systems;
- demonstrate how to carry out post service checks on vehicles;
- demonstrate how to complete a job card or service check sheet;
- demonstrate how to report and record any faults or problems found;
- demonstrate how to properly clean the work area and safely dispose of waste products;
- evaluate their own performance in the practical tasks; and
- carry out an end-of-unit evaluation.

Vehicle Valeting

Learners should be able to:

- demonstrate how to wash the outside of a vehicle, including paintwork, bumpers, glass and door sills, and dry it off with a chamois;
- demonstrate how to polish the outside of a vehicle, to include paintwork and plastics, rubber and glass surfaces;
- demonstrate how to clean the interior of the vehicle to include all surfaces: plastic, soft trim, fabric, leather, glass and carpet;
- demonstrate how to store leftover cleaning agents safely in the correct location;
- evaluate their own performance in the practical tasks; and
- carry out an end-of-unit evaluation.

UNIT 45

Vehicle Servicing and Valeting Operations

Assessment Guidance

Observation of work activities, examination of work completed, jobs cards, check sheets and photographic evidence are the preferred means of assessment. Teachers/Lecturers should emphasise the importance of a safe working environment and the careful use of tools and equipment.

Teaching centres will require appropriate resources to deliver this unit to industry standards, including access to cars, and appropriate specialist equipment and resources.

Two practical assessment tasks should be carried out, including one vehicle service task and one vehicle valeting task.

Exemplar Assessment

Carry out a ten thousand mile service on a car.

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- follow instructions on job card;
- prepare the work area and vehicle appropriately;
- select the correct tools and equipment for the job and check that these are in a safe working condition;
- work safely to carry out tasks to manufacturers' or workshop specifications;
- maintain tools and equipment in the appropriate manner and return to their storage location;
- tidy the work area and dispose of waste products;
- present vehicle for assessment;
- evaluate their own performance in the practical task; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Vehicle Servicing and Valeting Operations

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate excellent understanding of potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop	• Demonstrate very good understanding of potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop	• Demonstrate good understanding of potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop
		• Demonstrate excellent understanding of the implications of the Health and Safety at Work Act 1974 in a motor vehicle workshop	• Demonstrate very good understanding of the implications of the Health and Safety at Work Act 1974 in a motor vehicle workshop	• Demonstrate good understanding of the implications of the Health and Safety at Work Act 1974 in a motor vehicle workshop
		• Demonstrate excellent understanding of environmental regulations	• Demonstrate very good understanding of environmental regulations	• Demonstrate good understanding of environmental regulations
		• Demonstrate excellent understanding of career opportunities in vehicle servicing and valeting	• Demonstrate very good understanding of career opportunities in vehicle servicing and valeting	• Demonstrate good understanding of career opportunities in vehicle servicing and valeting
	Materials and related skills and knowledge	• Demonstrate excellent knowledge of vehicle servicing and valeting procedures	• Demonstrate very good knowledge of vehicle servicing and valeting procedures	• Demonstrate good knowledge of vehicle servicing and valeting procedures
		• Provide an excellent explanation of why it is necessary to service and valet vehicles	• Provide a very good explanation of why it is necessary to service and valet vehicles	• Provide a good explanation of why it is necessary to service and valet vehicles
		• Demonstrate an excellent knowledge of the tools and equipment used to carry out service and valeting operations	• Demonstrate a very good knowledge of the tools and equipment used to carry out service and valeting operations	• Demonstrate a good knowledge of the tools and equipment used to carry out service and valeting operations

UNIT 45 Vehicle Servicing and Valeting Operations

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate satisfactory understanding of potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop • Demonstrate satisfactory understanding of the implications of the Health and Safety at Work Act 1974 in a motor vehicle workshop • Demonstrate satisfactory understanding of environmental regulations • Demonstrate satisfactory understanding of career opportunities in vehicle servicing and valeting • Demonstrate satisfactory knowledge of vehicle servicing and valeting procedures	• Demonstrate basic understanding of potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop • Demonstrate basic understanding of the implications of the Health and Safety at Work Act 1974 in a motor vehicle workshop • Demonstrate basic understanding of environmental regulations • Demonstrate basic understanding of career opportunities in vehicle servicing and valeting • Demonstrate basic knowledge of vehicle servicing and valeting procedures
	Materials and related skills and knowledge	• Provide a satisfactory explanation of why we service and valet vehicles • Demonstrate a satisfactory knowledge of the tools and equipment used to carry out service and valeting operations	• Provide a basic explanation of why we service and valet vehicles • Demonstrate a basic knowledge of the tools and equipment used to carry out service and valeting operations

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Resources**	• Show evidence of making excellent use of resources	• Show evidence of making very good use of resources	• Show evidence of making good use of resources
	Job cards and pre-valeting inspection records	• Complete job cards and pre-valeting inspection records to an excellent level of accuracy and understanding	• Complete job cards and pre-valeting inspection records to a very good level of accuracy and understanding	• Complete job cards and pre-valeting inspection records to a good level of accuracy and understanding
	Planning	• Demonstrate an excellent degree of planning and have all correct tools, equipment and materials available before starting the tasks	• Demonstrate a very good degree of planning and have all correct tools, equipment and materials available before starting the tasks	• Demonstrate a good degree of planning and have all correct tools, equipment and materials available before starting the tasks
	Tools and equipment	• Demonstrate excellent use of tools and equipment relating to vehicle servicing and valeting techniques	• Demonstrate very good use of tools and equipment relating to vehicle servicing and valeting techniques	• Demonstrate good use of tools and equipment relating to vehicle servicing and valeting techniques
		• Demonstrate excellent skills in the correct maintenance and storage of tools and equipment	• Demonstrate very good skills in the correct maintenance and storage of tools and equipment	• Demonstrate good skills in the correct maintenance and storage of tools and equipment
	Practical outcomes	• Carry out servicing and valeting tasks to an excellent standard, ensuring tasks are completed in the correct order and within the agreed timescale	• Carry out servicing and valeting tasks to a very good standard, ensuring tasks are completed in the correct order and within the agreed timescale	• Carry out servicing and valeting tasks to a good standard, ensuring tasks are completed in the correct order and within the agreed timescale
	Waste materials and recycling	• Demonstrate excellent ability to dispose of or recycle waste components and materials	• Demonstrate very good ability to dispose of or recycle waste components and materials	• Demonstrate good ability to dispose of or recycle waste components and materials

Vehicle Servicing and Valeting Operations

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Resources**	• Show evidence of making satisfactory use of resources	• Show evidence of making basic use of resources
	Job cards and pre-valeting inspection records	• Complete job cards and pre-valeting inspection records to a satisfactory level of accuracy and understanding	• Complete job cards and pre-valeting inspection records to a basic level of accuracy and understanding
	Planning	• Demonstrate a satisfactory degree of planning and have all the correct tools, equipment and materials available before starting the tasks	• Demonstrate a basic degree of planning and have all the correct tools, equipment and materials available before starting the tasks
	Tools and equipment	• Demonstrate satisfactory use of tools and equipment relating to vehicle servicing and valeting techniques	• Demonstrate basic use of tools and equipment relating to vehicle servicing and valeting techniques
		• Demonstrate satisfactory skills in the correct maintenance and storage of tools and equipment	• Demonstrate basic skills in the correct maintenance and storage of tools and equipment
	Practical outcomes	• Carry out servicing and valeting tasks to a satisfactory standard, ensuring tasks are completed in the correct order and within the agreed timescale	• Carry out servicing and valeting tasks to a basic standard, ensuring tasks are completed in the correct order and within the agreed timescale
	Waste materials and recycling	• Demonstrate satisfactory ability to dispose of or recycle waste components and materials	• Demonstrate basic ability to dispose of or recycle waste components and materials

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	**Task evaluation**	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very good evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statements about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	**Task evaluation**	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

UNIT 45

Vehicle Servicing and Valeting Operations

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Resources						
Job cards and pre-valeting inspection records						
Planning						
Tools and equipment						
Practical outcomes						
Waste materials and recycling						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.

Vehicle Technician Operations

UNIT 46

This unit introduces learners to basic vehicle maintenance. It includes the engine compartment, transmission, chassis and vehicle electrics.

This unit is suitable for those who may be interested in pursuing careers as motor mechanics or vehicle technicians. Learners will explore career opportunities available in the motor vehicle industry.

They will also gain knowledge and understanding of health, safety and environmental legislation in the workplace and other skills associated with working in a garage.

The resources needed to support the delivery and assessment of this unit should be of industry standard. Staff delivering the programme and conducting the assessment should be familiar with current practice and standards in the sector.

This unit includes:

- consideration of health and safety issues in the motor vehicle industry;
- consideration of career opportunities in the motor vehicle industry;
- vehicle systems and components;
- tools and equipment for light vehicle operations;
- practical tasks on the engine, transmission, chassis and vehicle electrics;
- consideration of environmental issues in the motor vehicle industry; and
- a review and evaluation of performance.

UNIT 46

Vehicle Technician Operations

Learning Outcomes

Section 1 Health and Safety, Careers and Environmental Legislation

Learners should be able to:

- understand the implications of the Health and Safety at Work Act (HASAWA) 1974 in relation to this occupational area;
- understand the importance of personal presentation and conduct in maintaining health and safety in the workplace;
- understand the particular health and safety risks in their job and the precautions they must take;
- describe three career options available in the motor vehicle industry;
- work in a way that minimises the risk of:
  - damage to vehicle systems;
  - damage to components;
  - contact with leakage; and
  - contact with hazardous substances;
- explain the environmental regulations in relation to the safe disposal or recycling of scrap engines, transmission units, chassis components, scrap batteries and electrical components; and
- evaluate their own performance in practical tasks.

Section 2 Major Systems and Components

Learners should be able to:

- understand and use specialist vocabulary relating to light vehicles, for example the purpose of major components (engine technology, transmission technology, chassis technology, electrical and electronic technology);
- be familiar with torque settings and procedures for tightening components;
- understand how to find and use suitable sources of information and technical data from workshop manuals, data books, manufacturers' information sheets and the internet;
- understand and display a working knowledge of vehicle systems, including the engine, clutch, transmission and drive shafts; and
- evaluate their own performance in practical tasks.

Section 3 Tools and Equipment

Learners should be able to:

- have an understanding of using equipment relating to light vehicles such as the main tools for specific tasks, for example spanners, socket sets, levers, screwdrivers, hammers, pliers and self-locking grips, clutch alignment kits, coil spring clamps, hydrometers, discharge testers, battery testers/chargers, voltmeters, multimeters, ammeters, manufacturer's specified specialist tools, torque wrenches, trolley jacks, or low and high reach axle stands;
- select and use the correct tools and equipment for the components they are going to remove and refit;
- ensure that the tools and equipment they require are in a safe working condition; and
- evaluate their own performance in practical tasks.

Section 4 Practical Tasks

Learners should be able to:

- dismantle, inspect and rebuild the timing belt assembly, water pump, sump and flywheel (engine);
- separate the gearbox, dismantle the clutch assembly, refit and align to the fly wheel; remove the driveshaft, gaiter or rubber boot and inspect the constant velocity joint or remove the propeller shaft to inspect the universal joints and rebuild (transmission);
- dismantle, inspect and rebuild a track rod end, bottom ball joint and bottom suspension arm; dismantle, inspect and replace one coil spring on either strut type suspension or wishbone type suspension layout and remove and replace a brake caliper and disc assembly (chassis);
- remove, test and replace one battery, one starter motor and one alternator, checking that the refitted components operate correctly, and remove, replace and reset headlights, including bulbs, identifying fuses and testing their operation, replacing components as necessary and making repairs to the electrical circuit (electrical);
- evaluate their own performance in practical tasks; and
- carry out an end-of-unit evaluation.

Vehicle Technician Operations

Assessment Guidance

Teachers/Lecturers should emphasise the importance of a clean, tidy and safe working environment.

Observation of work activities, examination of work completed, job cards, check sheets and photographs are the preferred means of assessment. Practical demonstrations can be supported by oral and/or written questions to check the learner's knowledge and understanding.

The assessment should include tidying the work area, safely removing all dirt and cleaning all tools used. All waste materials should be recycled, if possible, or disposed of in an environmentally friendly way.

Practical occupational tasks selected should reflect the breadth of opportunity for learners to be stretched and challenged when demonstrating their skills in line with this specification.

Teaching centres are expected to use industry standard resources for this unit. Training units can be used for some of the task, but multiple complete cars are required for elements of the specification, including testing of vehicle electrics.

Learners should carry out **two** practical assessment tasks from the list in Section 4.

Exemplar Assessment

Electrical

Learners:

- answer questions to demonstrate knowledge and understanding requirements;
- read and understand instructions/task details on a job card or check list;
- prepare the work area, selecting appropriate tools and equipment;
- carry out the task to manufacturer's or workshop specification and in a safe manner;
- remove, test and replace a starter motor and alternator;
- remove the headlights and replace the bulbs and reset;
- check and replace fuses as necessary;
- maintain tools appropriately and return them to the storage area;
- tidy the work area and dispose of waste products appropriately;
- complete and sign off the job card/check sheet;
- present the vehicle for assessment and feedback;
- evaluate their own performance in the practical activity; and
- carry out an end-of-unit evaluation.

Performance Descriptors: Vehicle Technician Operations

A learner whose achievement falls below the criteria shown in the Basic Performance Descriptor will be awarded 0 marks.

AO1

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO1	**Health and safety, environment, and related careers**	• Demonstrate an excellent understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop	• Demonstrate a very good understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop	• Demonstrate a good understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop
		• Demonstrate an excellent understanding of environmental issues in the motor vehicle industry	• Demonstrate a very good understanding of environmental issues in the motor vehicle industry	• Demonstrate a good understanding of environmental issues in the motor vehicle industry
		• Demonstrate an excellent understanding of career opportunities and progression in the motor vehicle industry	• Demonstrate a very good understanding of career opportunities and progression in the motor vehicle industry	• Demonstrate a good understanding of career opportunities and progression in the motor vehicle industry
	Materials and related skills and knowledge	• Demonstrate an excellent knowledge of vehicle maintenance, tools, components and equipment	• Demonstrate a very good knowledge of vehicle maintenance, tools, components and equipment	• Demonstrate a good knowledge of vehicle maintenance, tools, components and equipment
		• Provide an excellent explanation of vehicle maintenance	• Provide a very good explanation of vehicle maintenance	• Provide a good explanation of vehicle maintenance
		• Demonstrate an excellent working knowledge of the workshop equipment, tools and components used to carry out vehicle maintenance operations	• Demonstrate a very good working knowledge of the workshop equipment, tools and components used to carry out vehicle maintenance operations	• Demonstrate a good working knowledge of the workshop equipment, tools and components used to carry out vehicle maintenance operations

Vehicle Technician Operations

AO1

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO1	**Health and safety, environment, and related careers**	• Demonstrate a satisfactory understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop	• Demonstrate a basic understanding of the potential hazards of using workshop components, equipment and basic hand tools in a motor vehicle workshop
		• Demonstrate a satisfactory understanding of environmental issues in the motor vehicle industry	• Demonstrate a basic understanding of environmental issues in the motor vehicle industry
		• Demonstrate a satisfactory understanding of career opportunities and progression in the motor vehicle industry	• Demonstrate a basic understanding of career opportunities and progression in the motor vehicle industry
	Materials and related skills and knowledge	• Demonstrate a satisfactory knowledge of vehicle maintenance, tools, components and equipment	• Demonstrate a basic knowledge of vehicle maintenance, tools, components and equipment
		• Provide a satisfactory explanation of vehicle maintenance	• Provide a basic explanation of vehicle maintenance
		• Demonstrate a satisfactory working knowledge of the workshop equipment, tools and components used to carry out vehicle maintenance operations	• Demonstrate a basic working knowledge of the workshop equipment, tools and components used to carry out vehicle maintenance operations

AO2

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO2	**Resources**	• Demonstrate excellent use of resources	• Demonstrate very good use of resources	• Demonstrate good use of resources
	Written records	• Demonstrate excellent skills in keeping records of practical tasks, including job cards and check or data sheets	• Demonstrate very good skills in keeping records of practical tasks, including job cards and check or data sheets	• Demonstrate good skills in keeping records of practical tasks, including job cards and check or data sheets
	Tools and equipment	• Demonstrate excellent use of machines, tools and equipment relating to vehicle maintenance techniques	• Demonstrate very good use of machines, tools and equipment relating to vehicle maintenance techniques	• Demonstrate good use of machines, tools and equipment relating to vehicle maintenance techniques
	Planning	• Demonstrate excellent planning skills and have all tools, equipment and components available before starting the task	• Demonstrate very good planning skills and have all tools, equipment and components available before starting the task	• Demonstrate good planning skills and have all tools, equipment and components available before starting the task
	Practical activity	• Carry out vehicle maintenance tasks to an excellent standard, ensuring that tasks are completed in the correct order and within the agreed timescale	• Carry out vehicle maintenance tasks to a very good standard, ensuring that tasks are completed in the correct order and within the agreed timescale	• Carry out vehicle maintenance tasks to a good standard, ensuring that tasks are completed in the correct order and within the agreed timescale
	Waste materials and recycling	• Demonstrate excellent ability to recycle or dispose of all waste from the maintenance activities	• Demonstrate very good ability to recycle or dispose of all waste from the maintenance activities	• Demonstrate good ability to recycle or dispose of all waste from the maintenance activities

AO2

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO2	**Resources**	• Demonstrate satisfactory use of resources	• Demonstrate basic use of resources
	Written records	• Demonstrate satisfactory skills in keeping records of practical tasks, including job cards and check or data sheets	• Demonstrate basic skills in keeping records of practical tasks, including job cards and check or data sheets
	Tools and equipment	• Demonstrate satisfactory use of machines, tools and equipment relating to vehicle maintenance techniques	• Demonstrate basic use of machines, tools and equipment relating to vehicle maintenance techniques
	Planning	• Demonstrate a satisfactory planning skills and have all tools, equipment and components available before starting the task	• Demonstrate a basic planning skills and have all tools, equipment and components available before starting the task
	Practical activity	• Carry out vehicle maintenance tasks to a satisfactory standard, ensuring that tasks are completed in the correct order and within the agreed timescale	• Carry out vehicle maintenance tasks to a basic standard, ensuring that tasks are completed in the correct order and within the agreed timescale
	Waste materials and recycling	• Demonstrate satisfactory ability to recycle or dispose of all waste from the maintenance activities	• Demonstrate basic ability to recycle or dispose of all waste from the maintenance activities

AO3

	Assessment Criteria	Performance Descriptor Excellent 10–9	Performance Descriptor Very Good 8–7	Performance Descriptor Good 6–5
AO3	**Task evaluation**	• Show evidence of an excellent evaluation for each practical assessment task	• Show evidence of a very god evaluation for each practical assessment task	• Show evidence of a good evaluation for each practical assessment task
	Final evaluation	• Produce excellent self-reflective statements about the learning process in this unit	• Produce very good self-reflective statement about the learning process in this unit	• Produce good self-reflective statements about the learning process in this unit

AO3

	Assessment Criteria	Performance Descriptor Satisfactory 4–3	Performance Descriptor Basic 2–1
AO3	**Task evaluation**	• Show evidence of a satisfactory evaluation for each practical assessment task	• Show evidence of a basic evaluation for each practical assessment task
	Final evaluation	• Produce satisfactory self-reflective statements about the learning process in this unit	• Produce basic self-reflective statements about the learning process in this unit

Learner Unit Tracking Grid

Please record the total marks from all assessments for each learner outcome.

Learner Outcome	Excellent	Very Good	Good	Satisfactory	Basic	Unworthy of Credit
	10–9	8–7	6–5	4–3	2–1	0
AO1						
Health and safety, environment, and related careers						
Materials and related skills and knowledge						
AO2						
Resources						
Written records						
Tools and equipment						
Planning						
Practical activity						
Waste materials and recycling						
AO3						
Task evaluation						
Final evaluation						
Total score per column						
Total score for unit (max 100)						
My Diary completed	Yes	☐	No	☐		
My Record completed	Yes	☐	No	☐		

The final award will be based on the combined scores of **two units**, as shown in Section 3.4 of the Specification.