QUALIFICATION HANDBOOK

Diploma in Accident Repair Body and Alignment Principles at SCQF Level 6 (4391-13)

February 2018 Version 2.2

City & Guilds

Qualification at a glance

Subject area	**Vehicle Accident Repair**
City & Guilds number	4391
Age group approved	16-18, 19+
Entry requirements	There are no entry requirements
Assessment	Online multiple choice tests (graded Pass, Merit, Distinction) and assignments (graded Pass)
Fast track	Not available; automatic approval applies in some cases
Support materials	Centre handbook Practical assessment workbook
Registration and certification	Consult the Walled Garden/online online catalogue for last dates

Title and level	City & Guilds number	Accreditation number
Diploma in Accident Repair Body and Alignment Principles at SCQF Level 6	4391-13	R169 04

Version and date	Change detail	Section
1.1 Feb 2013	Correct typographical errors	**All**
2.0 Aug 2013	Title amended to 'Diploma in Accident Repair Body and Alignment Principles at SCQF Level 6'	**All**
2.1 Oct 2013	Unit supporting information updated with introductory text	**Units**
2.2 February 2018	Amended Quality Assurance Requirements	Appendix

Contents

1 Introduction

This document tells you what you need to do to deliver the qualification:

Area	Description
Who is the qualification for?	Candidates wanting to broaden their understanding of carrying out body repairs to motor vehicles as a result of an accident. It also gives them the opportunity to learn how to develop others. Successful candidates could use their knowledge and skills in a variety of roles including specialist repair or specialist finishing in a car bodywork workshop.
What does the qualification cover?	It combines theoretical knowledge and the development of practical skills in automotive accident repair. It covers areas such as body, mechanical and electrical repairs, and paint and trim.
Is the qualification part of a framework or initiative?	This qualification is part of the Scottish Automotive Maintenance and Repair Modern Apprenticeship Framework.
Who did we develop the qualification with?	This qualification was developed in collaboration with the Institute of the Motor Industry (IMI) the sector skills council for the automotive retail industry and other awarding organisations.
What opportunities for progression are there?	Allows candidates to progress into employment or to the following City & Guilds qualifications: • 4311-13 SVQ 3 in Vehicle Repair Body at SCQF Level 6 In addition, candidates who enjoy leading teams of people at work could also move onto team leader or management qualifications as offered through the Institute of Leadership and Management (ILM).

Structure

Qualification	Credits		
	Total	**Mandatory**	**Optional**
Diploma in Accident Repair Body and Alignment Principles at SCQF Level 6 (4391-13)	**77**	**73 credits**	**4 (minimum)**
		001, 003, 051, 053, 113, 114, 117, 119, 120, 163, 164, 167, 169, 170, 176	006 and 056 or 008 and 058 or 121 and 171 or 122 and 172 or 123 and 173 or 124 and 174 or 125 and 175

City & Guilds unit	Unit title	Credit value
Mandatory		
001	Skills in health, safety and good housekeeping In the automotive environment	7
003	Skills in supporting job roles in the automotive work environment	5
051	Knowledge of health, safety and good housekeeping in the automotive environment	3
053	Knowledge of support for job roles in the automotive work environment	3
113	Skills in removing and replacing motor vehicle body panels	5
114	Skills in motor vehicle body panel major repairs	5
117	Skills in identifying and rectifying motor vehicle body misalignment	5
119	Skills in motor vehicle body metal active gas (MAG) welding techniques	5
120	Skills in motor vehicle body resistance spot welding operations	5
163	Knowledge of removing and replacing structural motor vehicle body panels	6
164	Knowledge of motor vehicle body panel major repairs	6
167	Knowledge of identifying and rectifying motor vehicle body misalignment	6
169	Knowledge of motor vehicle body metal active gas (MAG) welding techniques	5
170	Knowledge of motor vehicle body resistance spot welding operations	5
176	Knowledge of motor vehicle construction and materials	2
Optional		
006	Skills in how to make learning possible through demonstrations and instruction	5
008	Skills to identify and agree motor vehicle customer service needs	5
056	Knowledge of how to make learning possible through demonstrations and instruction	5
058	Knowledge of how to identify and agree motor vehicle customer service needs	5
121	Skills in motor vehicle body metal inert gas (MIG) brazing operations	5
122	Skills in motor vehicle body aluminium metal inert gas (MIG) welding operations	5
123	Skills in motor vehicle body tungsten inert gas (TIG) welding operations	5

City & Guilds unit	Unit title	Credit value
124	Skills in motor vehicle body mechanical fastening operations	2
125	Skills in a motor vehicle body adhesive bonding operations	2
171	Knowledge of motor vehicle body metal inert gas (MIG) brazing operations	5
172	Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations	5
173	Knowledge of motor vehicle body tungsten inert gas (TIG) welding operations	5
174	Knowledge of motor vehicle body mechanical fastening operations	2
175	Knowledge of motor vehicle body adhesive bonding operations	2

2 Centre requirements

Approval

Centres already approved to offer the Level 3 Certificate/Diploma in Maintenance and Repair - Body (4101-62) will be automatically approved to register and certificate candidates on the 4391-13 (unless the centre is already subject to sanctions).

Centres will need to gain both centre and qualification approval. Please refer to the *Centre Manual - Supporting Customer Excellence* for further information.

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

Physical resources and site agreements

Centres must have access to sufficient equipment in the college, training centre or workplace to ensure candidates have the opportunity to cover all of the practical activities.

Centre staffing

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

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

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Assessors and internal verifiers

While the Assessor/Verifier (A/V) units are valued as qualifications for centre staff, they are not currently a requirement for this qualification.

Continuing professional development (CPD)

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

Candidate entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualifications successfully.

Please note that for funding purposes, candidates should not be entered for a qualification of the same type, content and level as that of a qualification they already hold.

Age restrictions

City & Guilds cannot accept any registrations for candidates under 16 as this qualification not approved for under 16s.

3 Delivering the qualification

Initial assessment and induction

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

- if the candidate has any specific training needs
- support and guidance they may need when working towards their qualification
- any units they have already completed, or credit they have accumulated which is relevant to the qualification
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualification[s], their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for this qualification:

Description	How to access
Centre handbook	**www.cityandguilds.com/automotive**
Practical assessment workbook	**www.cityandguilds.com/automotive**

4 Assessment

Assessment of the qualification

City & Guilds has written the following assessments to use with this qualification:

- Assignments (practical assessment workbooks) comprising of practical tasks and knowledge based questions to cover all learning outcomes. Graded Pass only.
- Online multiple choice tests graded as Pass, Merit, Distinction.
- Assignments can be downloaded from **www.cityandguilds.com/automotive**. These assessments are carried out in centres and must be completed to current industry standards and practice.

Assessment requirements for all skills units are shown in full in our assessment documentation.

Full details of the assessment requirements relating to these qualifications can be obtained directly from the Institute of the Motor Industry (IMI) http://www.motor.org.uk

Time constraints

The following must be applied to the assessment of this qualification:

- Candidates must complete their assessments within their registration period.

Test specifications

Summary test specifications for all 4391 online tests can be found in the 'Automotive online test specifications' document, downloadable from the 4391 website.

Diploma in Accident Repair Body and Alignment Principles at SCQF Level 6

City & Guilds unit	Level	Unit title	Credit value	Assessment method
001	Level 5	Skills in health, safety and good housekeeping in the automotive environment	7	Assignment
003	Level 6	Skills in supporting job roles in the automotive work environment	5	Assignment

City & Guilds unit	Level	Unit title	Credit value	Assessment method
006	Level 7	Skills how to make learning possible through demonstrations and instruction	5	Assignment
008	Level 6	Skills to identify and agree motor vehicle customer service needs	5	Assignment
051	Level 5	Knowledge of health, safety and good housekeeping in the automotive environment	3	Assignment
053	Level 6	Knowledge of support for job roles in the automotive work environment	3	Assignment
056	Level 7	Knowledge of how to make learning possible through demonstrations and instruction	5	Assignment
058	Level 6	Knowledge of how to identify and agree motor vehicle customer service needs	5	Assignment
113	Level 6	Skills in removing and replacing motor vehicle body panels	5	Assignment
114	Level 6	Skills in motor vehicle body panel major repairs	5	Assignment
117	Level 6	Skills in identifying and rectifying motor vehicle body misalignment	5	Assignment
119	Level 5	Skills in motor vehicle body metal active gas (MAG) welding techniques	5	Assignment
120	Level 5	Skills in motor vehicle body resistance spot welding operations	5	Assignment
121	Level 6	Skills in motor vehicle body metal inert gas (MIG) brazing operations	5	Assignment
122	Level 6	Skills in motor vehicle body aluminium metal inert gas (MIG) welding operations	5	Assignment
123	Level 6	Skills in motor vehicle body tungsten inert gas (TIG) welding operations	5	Assignment
124	Level 5	Skills in motor vehicle body mechanical fastening operations	2	Assignment
125	Level 5	Skills in a motor vehicle body adhesive bonding operations	2	Assignment

City & Guilds unit	Level	Unit title	Credit value	Assessment method
163	Level 6	Knowledge of removing and replacing structural motor vehicle body panels	6	Multiple choice test
164	Level 6	Knowledge of motor vehicle body panel major repairs	6	Multiple choice test
167	Level 6	Knowledge of identifying and rectifying motor vehicle body misalignment	6	Multiple choice test
169	Level 5	Knowledge of motor vehicle body metal active gas (MAG) welding techniques	5	Multiple choice test
170	Level 5	Knowledge of motor vehicle body resistance spot welding operations	5	Multiple choice test
171	Level 6	Knowledge of motor vehicle body metal inert gas (MIG) brazing operations	5	Multiple choice test
172	Level 6	Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations	5	Multiple choice test
173	Level 6	Knowledge of motor vehicle body tungsten inert gas (TIG) welding operations	5	Multiple choice test
174	Level 5	Knowledge of motor vehicle body mechanical fastening operations	2	Multiple choice test
175	Level 5	Knowledge of motor vehicle body adhesive bonding operations	2	Multiple choice test
176	Level 5	Knowledge of motor vehicle construction and materials	2	Multiple choice test

5 Units

Structure of units

These units each have the following:

- City & Guilds reference number
- title
- SCQF level
- credit value
- unit aim
- relationship to NOS, other qualifications and frameworks
- endorsement by a sector or other appropriate body
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria
- supporting information - range.

Unit 001 Skills in health, safety and good housekeeping in the automotive environment

Level:	**5**
Credit value:	7
Relationship to NOS:	This unit is linked to NOS G1 - Contribute to Housekeeping in Motor Vehicle Environment and G2 - Reduce Risks to Health and Safety in the Motor Vehicle Environment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will enable the learner to develop the skills required to: • carry out day to day work area cleaning, clearing away, dealing with spillages and disposal of waste, used materials and debris • identify hazards and risks in the automotive environment and complying with relevant legislation and good practice • work safely at all times within the automotive environment, both as an individual and with others.

Learning outcome
The learner will: 1. be able to use correct personal and vehicle protection within the automotive environment
Assessment criteria
The learner can: 1.1 select and use personal protective equipment throughout activities. To include appropriate protection of a. eyes b. ears c. head d. skin e. feet f. hands g. lungs 1.2 select and use vehicle protective equipment throughout all activities.

Learning outcome
The learner will: 2. be able to carry out effective housekeeping practices in the automotive environment
Assessment criteria
The learner can: 2.1 select and use cleaning equipment which is of the right type and suitable for the task 2.2 use utilities and appropriate consumables, avoiding waste 2.3 use materials and equipment to carry out cleaning and maintenance duties in allocated work areas, following automotive work environment policies, schedules and manufacturer's instructions 2.4 perform housekeeping activities safely and in a way which minimises inconvenience to customers and staff 2.5 keep the work area clean and free from debris and waste materials 2.6 keep tools and equipment fit for purpose by regular cleaning and keeping tidy 2.7 dispose of used cleaning agents, waste materials and debris to comply with legal and workplace requirements.

Learning outcome
The learner will: 3. be able to recognise and deal with dangers in order to work safely within the automotive workplace
Assessment criteria
The learner can: 3.1 name and locate the responsible persons for health and safety in their relevant workplace 3.2 identify and report working practices and hazards which could be harmful to themselves or others 3.3 carry out safe working practices whilst working with equipment, materials and products in the automotive environment 3.4 rectify health and safety risks encountered at work, within the scope and capability of their job role.

Learning outcome
The learner will: 4. be able to conduct themselves responsibly
Assessment criteria
The learner can: 4.1 show personal conduct in the workplace which does not endanger the health and safety of themselves or others 4.2 display suitable personal presentation at work which ensures the health and safety of themselves and others at work.

Unit 003 Skills in supporting job roles in the automotive work environment

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS G3 - Maintain Working Relationships in the Motor Vehicle Environment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit is about the skills needed to develop and keep good working relationships with all colleagues in the workplace by using effective communication and support skills.

Learning outcome	**The learner will:**
1. be able to work effectively within the organisational structure of the automotive work environment	
Assessment criteria	
The learner can: 1.1 respond promptly and willingly to requests for assistance from customers and colleagues 1.2 refer customers and colleagues to the correct person should requests fall outside their responsibility and capability.	

Learning outcome	**The learner will:**
2. be able to obtain and use information in order to support their job role within the automotive work environment	
Assessment criteria	
The learner can: 2.1 select and use legal and technical information, in an automotive work environment.	

Learning outcome	The learner will:
3. be able to communicate with and support colleagues and customers effectively within the automotive work environment	
Assessment criteria	
The learner can: 3.1 use methods of communication with customers and colleagues which meet their needs 3.2 give customers and colleagues accurate information 3.3 make requests for assistance from or to customers and colleagues clearly and courteously.	

Learning outcome	The learner will:
4. be able to develop and keep good working relationships in the automotive work environment	
Assessment criteria	
The learner can: 4.1 contribute to team work by initiating ideas and co-operating with customers and colleagues 4.2 treat customers and colleagues in a way which shows respect for their views and opinions 4.3 make and keep achievable commitments to customers and colleagues 4.4 inform colleagues promptly of anything likely to affect their own work.	

Unit 006 Skills in how to make learning possible through demonstrations and instruction

Level:	**7**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS G6 – Demonstrating Skills in Making Learning Possible through Demonstration and Instruction
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit covers the skills needed in order to carry out demonstrations and instruction which will help the learner to learn. It includes demonstrating equipment, showing skills, giving instruction, deciding when to use demonstration or instruction, potential of technology based learning, checking on learners' progress and giving feedback.

Learning outcome	**The learner will:**
1. be able to demonstrate skills and methods to learners	
Assessment criteria	
The learner can: 1.1 perform demonstrations based on an analysis of the skills needed and the order in which they must be learned 1.2 perform demonstrations that are accurate and realistic 1.3 perform structured demonstrations so that the learner can get the most out of it 1.4 perform demonstrations whilst encouraging learners to ask questions and get explanation at appropriate stages in the demonstration 1.5 provide positive feedback to learners whilst they are being given the opportunity to practise the skills that have been demonstrated 1.6 perform additional demonstrations of skills being taught to reinforce learning 1.7 perform demonstrations in a safe environment which also allows learners to see clearly 1.8 respond to the needs of the learners during demonstrations 1.9 reduce distractions and disruptions as much as possible.	

Learning outcome	The learner will:
2. be able to instruct learners	
Assessment criteria	
The learner can: 2.1 implement instruction which is matched to the needs of learners 2.2 use identified learning outcomes which can be achieved through instruction 2.3 perform instruction, ensuring that the manner, level and speed of the instruction encourages learners to take part 2.4 perform instruction whilst regularly checking that the learners understand and adapt instruction as appropriate 2.5 give learners positive feedback on the learning experience and the outcomes achieved 2.6 carry out a review with the learners to identify anything that prevented learning and adapt instruction as appropriate.	

Unit 008 Skills to identify and agree motor vehicle customer service needs

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS G8 - Identify and Agree the Motor Vehicle Customer Needs.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit helps the learner to develop the skills required to: gain information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Learning outcome
The learner will: 1. be able to obtain relevant information from the customer
Assessment criteria
The learner can: 1.1 obtain and interpret sufficient, relevant information, from the customer to make an assessment of their needs 1.2 clarify customer and vehicle needs by referring to vehicle data and operating procedures.

Learning outcome
The learner will: 2. be able to provide relevant information to the customer
Assessment criteria
The learner can: 2.1 provide customers with accurate, current and relevant advice and information, in a form that the customer will understand 2.2 demonstrate techniques which encourage customers to ask questions and seek clarification during conversation.

Learning outcome
The learner will: 3. be able to agree work undertaken with the customer
Assessment criteria
The learner can: 3.1 summarise and record work agreed with the customer, before accepting the vehicle 3.2 implement confirmation of the agreement by ensuring customer understanding.

Learning outcome
The learner will: 4. be able to ensure recording systems are implemented correctly
Assessment criteria
The learner can: 4.1 use recording systems which are accurate and complete, in the required format and signed by the customer where necessary 4.2 perform the next stage in the process by passing on completed records to the correct person promptly 4.3 demonstrate correct procedures for customer approval where the contracted agreement is likely to be exceeded.

Unit 051 Knowledge of health, safety and good housekeeping in the automotive environment

Level:	**5**
Credit value:	3
Relationship to NOS:	This unit is linked to NOS G1 - Contribute to Housekeeping in Motor Vehicle Environment and G2 - Reduce Risks to Health and Safety in the Motor Vehicle Environment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of: • routine maintenance and cleaning of the automotive environment and using resources economically • health and safety legislation and duties of everyone in the motor vehicle environment. It will provide an appreciation of significant risks in the automotive environment and how to identify and deal with them. Once completed the learner will be able to identify hazards and evaluate and reduce risk.

Learning outcome	**The learner will:**
1.	understand the correct personal and vehicle protective equipment to be used within the automotive environment
Assessment criteria	
The learner can:	
1.1	explain the importance of wearing the types of PPE required for a range automotive repair activities
1.2	identify vehicle protective equipment for a range of repair activities
1.3	describe vehicle and personal safety considerations when working at the roadside.

Learning outcome	The learner will:
2. understand effective housekeeping practices in the automotive environment	
Assessment criteria	
The learner can: 2.1 describe why the automotive environment should be properly cleaned and maintained 2.2 describe requirements and systems which may be put in place to ensure a clean automotive environment 2.3 describe how to minimize waste when using utilities and consumables 2.4 state the procedures and precautions necessary when cleaning and maintaining an automotive environment 2.5 describe the selection and use of cleaning equipment when dealing with general cleaning, spillages and leaks in the automotive environment. 2.6 describe procedures for correct disposal of waste materials from an automotive environment 2.7 describe procedures for starting and ending the working day which ensure effective housekeeping practices are followed.	

Learning outcome	The learner will:
3. understand key health and safety requirements relevant to the automotive environment	
Assessment criteria	
The learner can: 3.1 list the main legislation relating to automotive environment health and safety 3.2 describe the general legal duties of employers and employees required by current health and safety legislation 3.3 describe key, current health and safety requirements relating to the automotive environment 3.4 describe why workplace policies and procedures relating to health and safety are important.	

Learning outcome	The learner will:
4. understand about hazards and potential risks relevant to the automotive environment	
Assessment criteria	
The learner can: 4.1 identify key hazards and risks in an automotive environment 4.2 describe policies and procedures for reporting hazards, risks, health and safety matters in the automotive environment 4.3 state precautions and procedures which need to be taken when working with vehicles, associated materials, tools and equipment 4.4 identify fire extinguishers in common use and which types of fire they should be used on 4.5 identify key warning signs and their characteristics that are found in the vehicle repair environment 4.6 state the meaning of common product warning labels used in an automotive environment.	

Learning outcome	The learner will:
5. understand personal responsibilities	
Assessment criteria	
The learner can: 5.1 explain the importance of personal conduct in maintaining the health and safety of the individual and others 5.2 explain the importance of personal presentation in maintaining health safety and welfare.	

Unit 051 Knowledge of health, safety and good housekeeping in the automotive environment

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Economic use of resources

a. Consumable materials e.g. grease, oils, split pins, locking and fastening devices.

Requirement to maintain work area effectively

a. Cleaning tools and equipment to maximise workplace efficiency.
b. Requirement to carry out the housekeeping activities safely and in a way that minimises inconvenience to customers and staff.
c. Risks involved when using solvents and detergents.
d. Advantages of good housekeeping.

Spillages, leaks and waste materials

a. Relevance of safe systems of work to the storage and disposal of waste materials.
b. Requirement to store and dispose of waste, used materials and debris correctly.
c. Safe disposal of special / hazardous waste materials.
d. Advantages of recycling waste materials.
e. Dealing with spillages and leaks.

Basic legislative requirements

a. Provision and Use of Work Equipment Regulations 1992.
b. Power Presses Regulations 1992.
c. Pressure Systems and Transportable Gas Containers Regulations 1989.
d. Electricity at Work Regulations 1989.
e. Noise at Work Regulations 1989.
f. Manual Handling Operations Regulations 1992.
g. Health and Safety (Display Screen Equipment) Regulations 1992.
h. Abrasive Wheel Regulations.
i. Safe Working Loads.
j. Working at Height Regulations.

Routine maintenance of the workplace

a. Trainee's personal responsibilities and limits of their authority with regard to work equipment.

b. Risk assessment of the workplace activities and work equipment.
c. Workplace person responsible for training and maintenance of workplace equipment.
d. When and why safety equipment must be used.
e. Location of safety equipment.
f. Particular hazards associated with their work area and equipment.
g. Prohibited areas.
h. Plant and machinery that trainees must not use or operate.
i. Why and how faults on unsafe equipment should be reported.
j. Storing tools, equipment and products safely and appropriately.
k. Using the correct PPE.
l. Following manufacturer's recommendations.
m. Location of routine maintenance information eg electrical safety check log.

Legislation relevant to Health and Safety

a. HASAWA.
b. COSHH.
c. EPA.
d. Manual Handling Operations Regulations 1992.
e. PPE Regulations 1992.

General regulations to include an awareness of:

a. Health and Safety (Display Screen Equipment) Regulations 1992.
b. Health and Safety (First Aid) Regulations 1981.
c. Health and Safety (Safety Signs and Signals) Regulations 1996.
d. Health and Safety (Consultation with Employees) Regulations 1996.
e. Employers Liability (Compulsory Insurance) Act 1969 and Regulations 1998.
f. Confined Spaces Regulations 1997.
g. Noise at Work Regulations 1989.
h. Electricity at Work Regulations 1989.
i. Electricity (Safety) Regulations 1994.
j. Fire Precautions Act 1971.
k. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985.
l. Pressure Systems Safety Regulations 2000.
m. Waste Management 1991.
n. Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002.
o. Control of Asbestos at Work Regulations 2002.

Legislative duties

a. The purpose of a Health and Safety Policy.
b. The relevance of the Health and Safety Executive.
c. The relevance of an initial induction to Health and Safety requirements at your workplace.
d. General employee responsibilities under the HASAWA and the consequences of non-compliance.
e. General employer responsibilities under the HASAWA and the consequences of non-compliance.

f. The limits of authority with regard to Heath and Safety within a personal job role.
g. Workplace procedure to be followed to report Health and Safety matters.

Precautions to be taken when working with vehicles, workshop materials, tools and equipment including electrical safety, pneumatics and hydraulics

a. Accessing and interpreting safety information.
b. Seeking advice when needed.
c. Seeking assistance when required.
d. Reporting of unsafe equipment.
e. Storing tools, equipment and products safely and appropriately.
f. Using the correct PPE.
g. Following manufacturer's recommendations.
h. Following application procedures eg hazardous substances.
i. The correct selection and use of extraction equipment.

PPE to include:

a. Typical maintenance procedures for PPE equipment to include:
    i. typical maintenance log
    ii. cleaning procedures
    iii. filter maintenance
    iv. variation in glove types
    v. air quality checks.
b. Choice and fitting procedures for masks and air breathing equipment.
c. Typical workplace processes which would require the use of PPE to include:
    i. welding
    ii. sanding and grinding
    iii. filling
    iv. panel removal and replacement
    v. drilling
    vi. cutting
    vii. chiselling
    viii. removal of broken glass
    ix. removal of rubber seals from fire damaged vehicles
    x. removal of hypodermic needles
    xi. servicing activities
    xii. roadside recovery.
d. Unserviceable PPE.
e. PPE required for a range of automotive repair activities. To include appropriate protection of:
    i. eyes
    ii. ears
    iii. head
    iv. skin
    v. feet
    vi. hands
    vii. lungs.

Fire and extinguishers

a. Classification of fire types.
b. Using a fire extinguisher effectively.
c. Types of extinguishers:
    i. foam
    ii. dry powder
    iii. CO2
    iv. water
    v. fire blanket.

Action to be taken in the event of a fire to include:

a. The procedure as:
    i. raise the alarm
    ii. fight fire only if appropriate
    iii. evacuate building
    iv. call for assistance.

Product warning labels to include:

a. Reasons for placing warning labels on containers.
b. Warning labels in common use, to include:
    i. toxic
    ii. corrosive
    iii. poisonous
    iv. harmful
    v. irritant
    vi. flammable
    vii. explosive.

Warning signs and notices

a. Colours used for warning signs:
    i. red
    ii. blue
    iii. green.
b. Shapes and meaning of warning signs:
    i. round
    ii. triangular
    iii. square.
c. The meaning of prohibitive warning signs in common use.
d. The meaning of mandatory warning signs in common use.
e. The meaning of warning notices in common use.
f. General design of safe place warning signs.

Hazards and risks to include:

a. The difference between a risk and a hazard.
b. Potential risks resulting from:
    i. the use and maintenance of machinery or equipment
    ii. the use of materials or substances
    iii. accidental breakages and spillages
    iv. unsafe behaviour
    v. working practices that do not conform to laid down policies
    vi. environmental factors
    vii. personal presentation
    viii. unauthorised personnel, customers, contractors etc entering your work premises
    ix. working by the roadside
    x. vehicle recovery.
c. The employee's responsibilities in identifying and reporting risks within their working environment.
d. The method of reporting risks that are outside your limits of authority.
e. Potential causes of:
    i. fire
    ii. explosion
    iii. noise
    iv. harmful fumes
    v. slips
    vi. trips
    vii. falling objects
    viii. accidents whilst dealing with broken down vehicles.

Personal responsibilities

a. The purpose of workplace polices and procedures on:
    i. the use of safe working methods and equipment
    ii. the safe use of hazardous substances
    iii. smoking, eating , drinking and drugs
    iv. emergency procedures
    v. personal appearance.
b. The importance of personal appearance in the control of health and safety.

Action to be taken in the event of colleagues suffering accidents

a. The typical sequence of events following the discovery of an accident such as:
    i. make the area safe
    ii. remove hazards if appropriate i.e. switch off power
    iii. administer minor first aid
    iv. take appropriate action to re-assure the injured party
    v. raise the alarm
    vi. get help
    vii. report on the accident.

b. Typical examples of first aid which can be administered by persons at the scene of an accident:
    i. check for consciousness
    ii. stem bleeding
    iii. keep the injured person's airways free
    iv. place in the recovery position if injured person is unconscious
    v. issue plasters for minor cuts
    vi. action to prevent shock i.e. keep the injured party warm
    vii. administer water for minor burns or chemical injuries
    viii. wash eyes with water to remove dust or ingress of chemicals (battery acid)
    ix. need to seek professional help for serious injuries.
c. Examples of bad practice which may result in further injury such as:
    i. moving the injured party
    ii. removing foreign objects from wounds or eyes
    iii. inducing vomiting
    iv. straightening deformed limbs.

Unit 053 Knowledge of support for job roles in the automotive work environment

Level:	**6**
Credit value:	3
Relationship to NOS:	This unit is linked to NOS G3 - Maintain Working Relationships in the Motor Vehicle Environment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of how to keep good working relationships with all colleagues in the automotive work environment by using effective communication and support skills.

Learning outcome	**The learner will:**
1. understand key organisational structures, functions and roles within the automotive work environment	
Assessment criteria	
The learner can: 1.1 identify the purpose of different sections of a typical automotive work environment 1.2 explain organisational structures and lines of communication within the automotive work environment 1.3 explain levels of responsibility within specific job roles in an automotive workplace. To include: a. trainee b. skilled technician c. supervisor d. manager.	

Learning outcome	The learner will:
2. understand the importance of obtaining, interpreting and using information in order to support their job role within the automotive work environment	
Assessment criteria	
The learner can: 2.1 explain the importance of different sources of information in a automotive work environment 2.2 explain how to find, interpret and use relevant sources of information 2.3 describe the main legal requirements relating to the vehicle, including road safety requirements 2.4 explain the importance of working to recognised procedures and processes 2.5 explain when replacement units and components must meet the manufacturers' original equipment specification 2.6 explain how to use identification codes.	

Learning outcome	The learner will:
3. understand the importance of different types of communication within the automotive work environment	
Assessment criteria	
The learner can: 3.1 explain where different methods of communication would be used within the automotive environment 3.2 explain the factors which can determine your choice of communication 3.3 explain how the communication of information can change with the target audience to include uninformed and informed people.	

Learning outcome	The learner will:
4. understand communication requirements when carrying out vehicle repairs in the automotive work environment	
Assessment criteria	
The learner can: 4.1 explain how to report using written and verbal communication 4.2 explain the importance of documenting information relating to work carried out in the automotive environment 4.3 explain the importance of working to agreed timescales.	

Learning outcome	The learner will:
5. understand how to develop good working relationships with colleagues and customers in the automotive workplace	
Assessment criteria	
The learner can: 5.1 describe how to develop positive working relationships with colleagues and customers 5.2 explain the importance of developing positive working relationships 5.3 explain the importance of accepting other people's views and opinions. 5.4 explain the importance of making and honouring realistic commitments to colleagues and customers.	

Unit 053 Knowledge of support for job roles in the automotive work environment

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

The structure of a typical vehicle repair business

a. How these areas relate to each other within the business
   i. body shop
   ii. vehicle repair workshop
   iii. paint shop
   iv. valeting
   v. vehicle parts store
   vi. main office
   vii. vehicle sales
   viii. reception.

Sources of information:

a. Other staff.
b. Manuals.
c. Parts lists.
d. Computer software and the internet.
e. Manufacturer.
f. Diagnostic equipment.

Communication requirements when carrying out vehicle repairs

a. Locating and using correct documentation and information for:
   i. recording vehicle maintenance and repairs
   ii. vehicle specifications
   iii. component specifications
   iv. oil and fluid specifications
   v. equipment and tools
   vi. identification codes.
b. Procedures for:
   i. referral of problems
   ii. reporting delays
   iii. additional work identified during repair or maintenance
   iv. keeping others informed of progress.

c. Methods of communication:
    i. verbal
    ii. signs and notices
    iii. memos
    iv. telephone
    v. electronic mail
    vi. vehicle job card
    vii. notice boards
    viii. SMS text messaging
    ix. letters.
d. Organisational and customer requirements:
    i. importance of time scales to customer and organization
    ii. relationship between time and costs
    iii. meaning of profit.
e. Choice of communication
    i. distance
    ii. location
    iii. job responsibility.
f. Importance of maintaining positive working relationships:
    i. morale
    ii. productivity
    iii. company image
    iv. customer relationships
    v. colleagues.

Unit 056 Knowledge of how to make learning possible through demonstrations and instruction

Level:	**7**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS G6 – Demonstrating Skills in Making Learning Possible through Demonstration and Instruction
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of how to carry out demonstrations and instruction which will help the learner to learn. It includes demonstrating equipment, showing skills, giving instruction, deciding when to use demonstration or instruction, potential of technology based learning, checking on learners' progress and giving feedback.

Learning outcome	**The learner will:**
1.	understand the nature and role of demonstrations and instruction
Assessment criteria	
The learner can:	
1.1	classify the separate areas of demonstrations which encourage learning
1.2	identify which types of learning are best achieved and supported through demonstrations
1.3	explain how to identify and use different learning opportunities
1.4	explain how to structure demonstrations and instruction sessions
1.5	explain how to choose from a range of demonstration techniques.

Learning outcome	The learner will:
2. understand the principles and concepts of demonstration and instruction	
Assessment criteria	
The learner can: 2.1 describe how to put learners at ease and encourage them to take part 2.2 justify the choice between demonstration and instruction as a learning method 2.3 explain how to identify individual learning needs 2.4 clarify which factors are likely to prevent learning and how to overcome them 2.5 explain how to check learners' understanding and progress 2.6 explain how to choose and prepare appropriate materials 2.7 explain the separate areas of instructional techniques which encourage learning 2.8 describe which types of learning are best achieved and supported through instruction.	

Learning outcome	The learner will:
3. understand the external factors influencing human resource development	
Assessment criteria	
The learner can: 3.1 explain how to make sure everybody acts in line with health, safety and environmental protection, legislation and best practice 3.2 analyse developments in technology based learning and new ways of delivery.	

Unit 056 Knowledge of how to make learning possible through demonstrations and instruction

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Separate areas of demonstration which encourage learning to include:

a. Demonstration is particularly applicable to learning manual skills.
b. Learning to do something usually involves:
    i. purpose – the aim or objective
    ii. procedure - the most effective way of completing the task
    iii. practice – all skills require practice to improve.
c. Practical tasks are more quickly learnt through demonstration.
d. Emphasis is required to body movements when demonstrating.
e. The demonstrator should encourage learners to ask questions.
f. Emphasis should be placed upon key points whilst demonstrating.
g. Any demonstration should ensure that all safety aspects are covered.

Types of learning which are best achieved and supported through demonstrations to include:

a. Types of learning:
    i. psychomotor – measurement of manual skill performance
    ii. cognitive – learning involving thought processes
    iii. affective – demonstration of feelings, emotions or attitudes.
b. Demonstration - involves learning to do something (Psychomotor Domain).
c. Combination of instruction and practical demonstrations are very effective means of learning practical skills.

How to structure demonstration and instruction sessions

To include:

a. Before the demonstration and/or instruction ensure that the following good practice is recognised:
    i. identify key points
    ii. relate theoretical underpinning knowledge to key points
    iii. rehearse to ensure that all equipment is working
    iv. ensure all students can see even small equipment and processes

v. time the demonstration
vi. consider how to make students participate
vii. consider how to emphasise safe working practices.

b. During the demonstration and/or instruction good practice is to:
i. give a clear introduction
ii. identify any tools/equipment
iii. determine the current audience level of knowledge
iv. complete the demonstration correctly (do not show how not to do it)
v. stress key points and show links between them
vi. monitor safety aspects
vii. check learner understanding.

c. After the demonstration (if possible)
i. enable the audience to practice the techniques
ii. provide feedback on their performance.

How to identify individual learning needs

a. Diagnose the learning needs of your audience to include:
i. what competencies they already have
ii. what experience they have of the subject area
iii. what competencies they need to achieve
iv. what demonstration techniques are best suited to their needs
v. how you will assess their needs have been met.

What factors are likely to prevent learning, to include:

a. language barriers
b. physical barriers
c. specialist knowledge
d. pace of learning
e. method of delivery
f. environmental factors
g. teaching styles
h. dyslexia.

How to check learners' understanding and progress

a. Questionnaires.
b. Verbal questioning.
c. Observation.
d. Assessment.
e. Role play.
f. Projects/assignments.
g. Multi-choice questions.
h. Simulation
i. Tests.

How to organise information and prepare materials

a. Identify the course aim.
b. Identify the subject aim.
c. Identify the lesson aim.
d. Complete a lesson plan - plan the teaching.
e. Identify a series of 'cues' to be used during the lesson.
f. Logically organise the information.
g. Use suitable resources and equipment to maximise learning opportunities.
h. Assess the learners' progress and understanding.

Instructional techniques

a. Types of instructional techniques to include:
    i. lectures
    ii. handouts
    iii. team teaching
    iv. peer teaching
    v. discussion – individual, group and peer
    vi. question and answer
    vii. multimedia
    viii. seminars
    ix. case studies
    x. project/assignments.

Environmental factors that affect learning

a. Environmental factors that should be considered before demonstration/instruction to include:
    i. loud noises
    ii. bright colours
    iii. bright lights
    iv. strong smells
    v. atmosphere
    vi. temperature
    vii. classroom seating
    viii. classroom layout

Health and safety factors that affect learning

a. Health and safety factors that should be considered before demonstration/instruction to include:
    i. assessment of risk and hazards
    ii. condition of electrical/electronic equipment
    iii. position of cables and wires
    iv. safety of equipment used in demonstration/instruction
    v. condition of classroom equipment/furniture/structure
    vi. suitable protective clothing/equipment.

Analysis of demonstration/instruction

a. Analysis of demonstration/instruction to include:
    i. feedback from students
    ii. feedback from colleagues
    iii. organisational quality assessment
    iv. feedback from external organisations
    v. awarding body requirements.

Developments in learning

To include:

a. multimedia based materials
b. web based materials
c. interactive materials.

How to choose and prepare appropriate materials

To include:

a. putting information in order
b. deciding whether the language used is appropriate
c. type of material i.e. paper and technology based etc.

Unit 058 Knowledge of how to identify and agree motor vehicle customer service needs

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS G8 - Identify and Agree the Motor Vehicle Customer Needs.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of how to gain: information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Learning outcome	**The learner will:**
1.	understand legislative and organisational requirements and procedures
Assessment criteria	
The learner can:	
1.1	describe the fundamental legal requirements of current consumer legislation and the consequences of their own actions in respect of this legislation
1.2	describe the content and limitations of company and product warranties for the vehicles dealt with by their company
1.3	explain the limits of their own authority for accepting vehicles
1.4	explain the importance of keeping customers informed of progress
1.5	describe their workplace requirements for the completion of records
1.6	explain how to complete and process all the necessary documentation.

Learning outcome	The learner will:
2. understand how to communicate and care for customers	
Assessment criteria	
The learner can: 2.1 explain how to communicate effectively with customers 2.2 describe how to adapt their language when explaining technical matters to non-technical customers 2.3 explain how to use effective questioning techniques 2.4 describe how to care for customers and achieve customer satisfaction.	

Learning outcome	The learner will:
3. understand company products and services	
Assessment criteria	
The learner can: 3.1 describe the range of options available to resolve vehicle problems 3.2 describe the range and type of services offered by their company 3.3 explain the effect of resource availability upon the receipt of customer vehicles and the completion work 3.4 explain how to access costing and work completion time information.	

Unit 058 Knowledge of how to identify and agree motor vehicle customer service needs

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Organisational requirements

a. Explain the organisation's terms and conditions applicable to the acceptance of customer vehicles.
b. Explain the content and limitations of vehicle and component warranties for the vehicles dealt with by your organisation.
c. Detail what, if any, limits there are to the authority for accepting vehicles.
d. Detail why it is important to keep customers advised of progress and how this is achieved within the organisation.
e. Detail the organisation's procedures for the completion and processing of documentation and records, including payment methods and obtaining customer signatures as applicable.

Principles of customer communication and care

a. First impressions.
b. Listening skills – 80:20 ratio.
c. Eye contact and smiling.
d. Showing interest and concern.
e. Questioning techniques and customer qualification.
f. Giving clear non-technical explanations.
g. Confirming understanding (statement/question technique, reflective summary).
h. Written communication – purpose, content, presentation and style.
i. Providing a high quality service – fulfilling (ideally exceeding) customer expectations within agreed time frames.
j. Obtaining customer feedback and corrective actions when dissatisfaction expressed.
k. Dealing with complaints.

Company products and services

a. Service standards:
    i. national
    ii. manufacturer
    iii. organisational.

b. The range and type of services offered by the organisation:
    i. diagnostic
    ii. servicing
    iii. repair
    iv. warranty
    v. MOT testing
    vi. fitment of accessories/enhancements
    vii. internal.
c. The courses of action available to resolve customer problems:
    i. the extent and nature of the work to be undertaken
    ii. the terms and conditions of acceptance
    iii. the cost
    iv. the timescale
    v. required payment methods.
d. The effect of resource availability upon the receipt of customer vehicles and the completion of work:
    i. levels and availability of equipment
    ii. levels and availability of technicians
    iii. workshop loading systems.
e. How to access costing and work completion time information:
    i. manuals
    ii. computer based.

Vehicle information systems, servicing and repair requirements

a. Accessing technical data including diagnostics.
b. Servicing to manufacturer requirements/standards.
c. Repair/operating procedures.
d. MOT standards/requirements.
e. Quality controls – interim and final.
f. Requirements for cleanliness of vehicle on return to customer.
g. Handover procedures.

Consumer legislation to include:

a. Consumer protection.
b. Sale of goods.
c. Data protection.
d. Product liability.
e. Health and safety.
f. Discrimination.

Unit 113 Skills in removing and replacing motor vehicle body panels

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP13 – Remove and Replace Motor Vehicle Body Panels.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will help the learner to develop skills in order to carry out the removal and fitting a range of non-permanently fixed vehicle panels such as wings, doors, bonnets, boot lids and tailgates. It also covers the evaluation of the operation of the components when fitted.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out removal and replacement of vehicle body panels	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all removal and replacement activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle removal and fitting activities including: a. vehicle technical data b. removal and fitting procedures c. legal requirements 2.2 use technical information to support motor vehicle removal and fitting activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out removal and fitting of vehicle body panels 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers when carrying out removal and fitting of vehicle body panels.	

Learning outcome	The learner will:
4. be able to carry out removal and fitting of vehicle body panels	
Assessment criteria	
The learner can: 4.1 identify prior to working on the vehicle the component materials that will be worked on during the repair or replacement 4.2 carry out the removal and fitting of non-permanently fixed, welded and bonded vehicle body panels 4.3 carry out removal and fitting of vehicle body panels to specification and tolerance following: a. the manufacturer's approved removal and fitting methods b. recognised researched removal and fitting methods c. health and safety requirements d. workplace procedures 4.4 ensure all test weld pieces conform to the current Industry Standard for appearance and penetration 4.5 use and apply sealants and anti corrosion materials to the manufacturers' specification 4.6 ensure that replacement panels conform to the vehicle specifications for dimension, material, quality of finish and functional capability 4.7 ensure the components are realigned to the manufacturers' tolerance 4.8 ensure damage to mating surfaces is minimised and any additional damage caused correctly reinstated 4.9 ensure panels are replaced without causing damage to the vehicle systems 4.10 ensure all components and panels are stored safely and in the correct location.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 114 Skills in motor vehicle body panel major repairs

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP14 – Repair Motor Vehicle Body Panels.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will help the learner to develop the skills required to carry out major repairs to motor vehicle body panels using a variety of techniques. It also covers the evaluation of the repair once completed.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out major repairs to motor vehicle body panels	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all repair activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle removal and fitting activities including: a. vehicle technical data b. removal and fitting procedures c. legal requirements 2.2 use technical information to support motor vehicle removal and fitting activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out major repairs to motor vehicle body panels 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the tools and equipment in the way specified by manufacturers when carrying out major repairs to motor vehicle body panels.	

Learning outcome	The learner will:
4. Be able to carry out major repairs to motor vehicle body panels	
Assessment criteria	
The learner can: 4.1 identify prior to working on the vehicle the component materials involved that will be worked on during the repair 4.2 ensure the methods of preparation leave sub-structure body panels clean, free from materials likely to hinder repair and free of surface finishes when required 4.3 prepare and reinstate vehicle body panels using the equipment recommended and following: a. the manufacturer's approved removal and fitting methods b. recognised researched removal and fitting methods c. health and safety requirements 4.4 carry out major repairs to motor vehicle body panels so they are restored to their original contour and dimensions using hand/power tools and filling materials effectively 4.5 replace any sealer, anti corrosion and sound deadening materials which were removed prior to the repair and conforming to the manufacturer's specification 4.6 ensure all test weld pieces conform to the current industry standard for appearance and penetration 4.7 ensure any damage is minimised to mating surfaces. Any damage caused should be reinstated 4.8 ensure all completed repairs are finished to and agreed standard ready for the refinishing process.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 117 Skills in identifying and rectifying motor vehicle body misalignment

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP17 – Identify and Rectify Motor Vehicle Body Misalignment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop the skills required to carry out identification and rectification of motor vehicle body misalignment. It also covers the evaluation of the repair once completed.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out identification and rectification to motor vehicle body misalignment	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all repair activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support the identification and rectification of motor vehicle body misalignment including: a. vehicle technical data b. removal and fitting procedures c. equipment data specific to the vehicle d. legal requirements 2.2 use technical information to support the identification and rectification of motor vehicle body misalignment.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out identification and rectification to motor vehicle body misalignment 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the appropriate tools and equipment in the way specified by manufacturers when carrying out identification and rectification to motor vehicle body misalignment.	

Learning outcome	The learner will:
4. be able to carry out identification and rectification to motor vehicle body misalignment	
Assessment criteria	
The learner can: 4.1 load and secure the vehicle to the body jig correctly following: a. the manufacturer's approved instructions b. recognised researched methods c. health and safety requirements 4.2 establish the extent of the vehicle misalignment accurately and completely 4.3 align and anchor areas adjacent to the damage in a way that prevents further damage to the vehicle 4.4 attach the pulling system securely to the damaged components and operate it to achieve the realignment required 4.5 operate the pulling system in a way that minimises the risk of injury to yourself and others 4.6 ensure all completed rectification activities restore the vehicle to the correct specification and tolerances.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 119 Skills in motor vehicle body metal active gas (MAG) welding techniques

Level:	**5**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP19 – Motor Vehicle Body MIG/MAG Welding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop the skills required to join materials using Metal Active Gas (MAG) welding techniques. It also covers the evaluation of the completed welded component.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out motor vehicle body MAG welding operations	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body MAG welding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body MAG welding operation activities including: a. vehicle technical data b. welding procedures c. legal requirements 2.2 use technical information to support motor vehicle body MAG welding operation activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body MAG welding operations 3.2 ensure all tools and equipment that are required are in a safe working condition 3.3 set up and use the appropriate tools and equipment in the way specified by manufacturers when carrying motor vehicle body MAG welding operations 3.4 clean and store PPE and equipment in the appropriate manner.	

Learning outcome	The learner will:
4. be able to carry out motor vehicle body MAG welding operations	
Assessment criteria	
The learner can: 4.1 prepare surface to ensure a good MAG weld is achieved 4.2 ensure alignment, mating and treatment of flanges to enable a suitable join to be achieved 4.3 conduct MAG weld operations including: a. lap plug b. lap seam c. butt joint d. fillet joint 4.4 conduct MAG weld operations following: a. manufacturer's processes, methods and procedures b. test procedures to provide test coupons on equivalent material in accordance with Industry Standards c. recognised researched repair methods 4.5 dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 4.6 recognise when the weld is not forming correctly and what action needs to be taken 4.7 inspect and assess quality of welds in accordance with industry standards and manufacturer's specification 4.8 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.9 ensure no damage is incurred to other vehicle systems when MAG welding.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 120 Skills in motor vehicle body resistance spot welding operations

Level:	**5**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP 20 – Motor Vehicle Body Resistance Spot Welding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will help the learner to develop the skills required to join materials correctly and effectively using resistance spot welding techniques and procedures. It also covers the evaluation of the completed welded component.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out motor vehicle body resistance spot welding operations	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body resistance spot welding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body resistance spot welding operation activities including: a. vehicle technical data b. welding procedures c. legal requirements 2.2 use technical information to support motor vehicle body resistance spot welding operation activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body resistance spot welding operations 3.2 ensure tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying out motor vehicle body resistance spot welding operations 3.4 clean and store PPE and equipment in the appropriate manner.	

Learning outcome	The learner will:
4. be able to carry out motor vehicle body resistance spot welding operations	
Assessment criteria	
The learner can: 4.1 carry out surface preparation to ensure a good resistance spot weld is achieved 4.2 ensure alignment and mating and treatment of flanges to enable a suitable join to be achieved 4.3 produce resistance spot welding operations following: a. manufacturer's processes, methods and procedures b. test procedures and providing test coupons on equivalent material in accordance with Industry Standards c. recognised researched repair methods 4.4 dress and protect the area to inhibit corrosion where applicable 4.5 identify when the weld is not forming correctly and what action needs to be taken 4.6 inspect and assess all resistance spot weld quality in accordance with Industry Standards and manufacturer's specification 4.7 ensure the integrity of the weld and record the type of weld achieved on the appropriate paperwork 4.8 store and record all weld test pieces 4.9 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.10 ensure no damage is incurred to other vehicle systems when resistance spot welding.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 121 Skills in motor vehicle body metal inert gas (MIG) brazing operations

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP 21 – Motor Vehicle Body MIG Brazing Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will help the learner to develop the skills required to join materials correctly and effectively using Metal Inert Gas (MIG) brazing techniques and procedures. It also covers the evaluation of the completed brazed component.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out motor vehicle body MIG brazing operations	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body MIG brazing operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body MIG brazing operations activities including: a. vehicle technical data b. welding procedures c. legal requirements 2.2 use technical information to support motor vehicle body MIG brazing operations activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body MIG brazing operations 3.2 ensure all tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying motor vehicle body MIG brazing operations 3.4 clean and store PPE and equipment in the appropriate manner.	

Learning outcome	The learner will:
4. be able to carry out motor vehicle body MIG brazing welding operations	
Assessment criteria	
The learner can: 4.1 prepare surface to ensure a good MIG brazing operation is achieved 4.2 ensure alignment, and mating treatment of flanges to enable a suitable join to be achieved 4.3 carry out MIG brazing operations including: a. lap slot b. lap seam c. butt joint 4.4 carry out MIG brazing operations following: a. manufacturer's processes, methods and procedures b. test procedures and providing test coupons on equivalent material in accordance with Industry Standards c. recognised researched repair methods 4.5 dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 4.6 recognise when the weld is not forming correctly and what action needs to be taken 4.7 inspect and assess all MIG brazing operations for quality in accordance with Industry Standards and manufacturer's specification 4.8 ensure the integrity of the weld and record the type of weld achieved on the appropriate paperwork 4.9 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.10 ensure no damage is incurred to other vehicle systems when carrying out MIG brazing operations.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 122 Skills in motor vehicle body aluminium metal inert gas (MIG) welding operations

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP22 – Motor Vehicle Body Aluminium Welding Operation.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will help the learner to develop the skills required to join materials correctly and effectively using aluminium Metal Inert Gas (MIG) welding techniques and procedures. It also covers the evaluation of the completed welded components.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out motor vehicle body aluminium MIG welding operations	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body aluminium MIG welding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body aluminium MIG welding operation activities including: a. vehicle technical data b. welding procedures c. legal requirements 2.2 use technical information to support motor vehicle body aluminium MIG welding operation activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body aluminium MIG welding operations 3.2 ensure tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying motor vehicle body aluminium MIG welding operations 3.4 clean and store PPE and equipment in the appropriate manner.	

Learning outcome	The learner will:
4. be able to carry out motor vehicle body aluminium MIG welding operations	
Assessment criteria	
The learner can: 4.1 prepare surface preparation to ensure a good aluminium weld is achieved 4.2 ensure alignment, and mating and treatment of flanges to enable a suitable join to be achieved 4.3 carry out aluminium welding operations including: a. lap seam b. butt joint c. fillet joint 4.4 carry out aluminium we lding operations following: a. manufacturer's processes, methods and procedures b. test procedures and providing test coupons on equivalent material in accordance with Industry Standards c. recognised researched repair methods 4.5 dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 4.6 identify when the weld is not forming correctly and what action needs to be taken 4.7 inspect and assess all aluminium weld quality in accordance with Industry Standards and manufacturer's specification 4.8 ensure the integrity of the weld and record the type of weld achieved on the appropriate paperwork 4.9 store and record all weld test pieces 4.10 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.11 ensure no damage is incurred to other vehicle systems when aluminium welding.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 123 Skills in motor vehicle body tungsten inert gas (TIG) welding operations

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP 23 – Motor Vehicle Body TIG Welding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will help the learner to develop the skills required to join materials using TIG welding techniques and procedures. It also covers the evaluation of the completed welded component.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out motor vehicle body TIG welding operations	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body TIG welding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body TIG welding operation activities including: a. vehicle technical data b. welding procedures c. legal requirements 2.2 use technical information to support motor vehicle body TIG welding operation activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body TIG welding operations 3.2 ensure tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying motor vehicle body TIG welding operations 3.4 clean and store PPE and equipment in the appropriate manner.	

Learning outcome	The learner will:
4. be able to carry out motor vehicle body TIG welding operations	
Assessment criteria	
The learner can: 4.1 prepare surface preparation to ensure a good TIG weld is achieved 4.2 ensure alignment, and mating and treatment of flanges to enable a suitable join to be achieved 4.3 carry out TIG welding operations including: a. lap seam b. butt joint c. fillet joint 4.4 carry out TIG welding operations following: a. manufacturer's processes, methods and procedures b. test procedures and providing test coupons on equivalent material in accordance with Industry Standards c. recognised researched repair methods 4.5 dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 4.6 identify when the weld is not forming correctly and what action needs to be taken 4.7 inspect and assess all TIG weld quality in accordance with industry standards and manufacturer's specification 4.8 ensure the integrity of the weld and record the type of weld achieved on the appropriate paperwork 4.9 store and record all weld test pieces 4.10 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.11 ensure no damage is incurred to other vehicle systems when TIG welding.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 124 Skills in motor vehicle body mechanical fastening operations

Level:	**5**
Credit value:	2
Relationship to NOS:	This unit is linked to NOS BP 24 – Motor Vehicle Body Mechanical Fastening Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will help the learner to develop the skills required to join materials using mechanical fastening techniques and procedures. It also covers the evaluation of the completed mechanical joint.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out motor vehicle body mechanical fastening operations	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body mechanical fastening operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body mechanical fastening operations activities including: a. vehicle technical data b. joining procedures c. legal requirements 2.2 use technical information to support motor vehicle body mechanical fastening operations activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body mechanical fastening operations 3.2 ensure all tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying motor vehicle body mechanical fastening operations 3.4 clean and store PPE and equipment in the appropriate manner.	

Learning outcome	The learner will:
4. be able to carry out motor vehicle body mechanical fastening operations	
Assessment criteria	
The learner can: 4.1 prepare surface to ensure a good mechanical fastening is achieved 4.2 ensure alignment and mating and treatment of flanges to enable a suitable join to be achieved 4.3 carry out a range of mechanical fastening 4.4 carry out mechanical fastening operations following: a. manufacturer's processes, methods and procedures b. recognised researched repair methods 4.5 dress and protect the joint area to inhibit corrosion where applicable 4.6 recognise when the joint is not forming correctly and what action needs to be taken 4.7 ensure integrity of the joint and record the type of joint achieved on the appropriate paperwork 4.8 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 125 Skills in a motor vehicle body adhesive bonding operations

Level:	**5**
GLH:	20
Relationship to NOS:	This unit is linked to NOS BP25 – Motor Vehicle Body Adhesive Bonding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit will help the learner to develop the skills required to join materials using adhesive bonding techniques and procedures. It also covers the evaluation of the completed joint.

Learning outcome	**The learner will:**
1. be able to work safely when carrying out motor vehicle body adhesive bonding operations	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body adhesive bonding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body adhesive bonding operation activities including: a. vehicle technical data b. joining procedures c. legal requirements 2.2 use technical information to support motor vehicle body adhesive bonding operation activities.	

Learning outcome	The learner will:
3. be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body adhesive bonding operations 3.2 ensure tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying motor vehicle body adhesive bonding operations 3.4 clean and store PPE and equipment in the appropriate manner.	

Learning outcome	The learner will:
4. be able to carry out motor vehicle body adhesive bonding operations	
Assessment criteria	
The learner can: 4.1 prepare surface to ensure a good adhesive bond is achieved 4.2 ensure alignment and mating and treatment of flanges to enable a suitable join to be achieved 4.3 carry out adhesive bonding operations following: a. manufacturer's processes, methods and procedures b. test procedures and providing test coupons on equivalent material c. recognised researched repair methods 4.4 dress and protect the area to inhibit corrosion where applicable 4.5 identify when the joint is not forming correctly and what action needs to be taken 4.6 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated.	

Learning outcome	The learner will:
5. be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 163 Knowledge of removing and replacing structural motor vehicle body panels

Level:	**6**
Credit value:	6
Relationship to NOS:	This unit is linked to NOS BP13 – Remove and Replace Motor Vehicle Body Panels.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of how to remove a range of exterior and sub-structure body panels and panel sections where these are damaged and how to refit with new or repaired replacements.

Learning outcome	**The learner will:**
1. understand material types and properties used in removing and replacing structural motor vehicle body panels	
Assessment criteria	
The learner can: 1.1 identify the properties and different types of materials used in the construction of vehicle bodies 1.2 explain the properties of the materials used in vehicle body construction 1.3 identify the properties and safe use of body component sealants, adhesives, and anti corrosion materials 1.4 explain how to apply sealants and anti corrosion materials following manufacturers' recommended methods 1.5 compare the advantages and limitations of vehicles built using chassis frame and monocoque construction 1.6 identify the implications of working with: a. galvanised coatings b. mild steels c. HSS d. UHSS e. aluminium alloys.	

Learning outcome	The learner will:
2. understand how to carry out removal and replacing of structural motor vehicle body panels	
Assessment criteria	
The learner can: 2.1 explain how to identify the manufacturers' joining techniques and how they may differ from the repair method 2.2 explain where the different types of mechanical fasteners should be used in the replacement of vehicle body panels 2.3 explain the procedures involved in the removal and replacement of vehicle body panels and assemblies 2.4 explain the procedures involved in the removal and replacement of vehicle door skins 2.5 explain the procedures involved in establishing cut lines for partial panel replacement 2.6 explain how to select the correct joints and joining processes for the repaired area 2.7 explain the importance of clamping and aligning panels to match existing contours and gaps 2.8 explain the effect on the overall body structure of removing and replacing panels 2.9 describe the procedures involved in loading a vehicle onto a jig system to ensure correct alignment and positioning of new panels 2.10 explain the importance of checking the accuracy of repair work 2.11 outline the quality checks that can be used to ensure correct alignment and contour of panels, and operation of components to manufacturers' specification 2.12 explain the methods and procedures for storing components and the importance of storing them correctly and in accordance with legal requirements.	

Unit 163 Knowledge of removing and replacing structural motor vehicle body panels

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Selection and use of tools and equipment

a. How to prepare, test and use the tools and equipment required for the removal and replacement of vehicle body panels and ancillary fittings.
b. How to operate spot welding and gas shielded arc-welding equipment to achieve welds to the current industry standard.

Selection and use of materials

a. The properties of sealants, adhesives and anti-corrosion materials and the requirement for their safe use.
b. The type of sealants and anti corrosion materials to use and the manufacturer's recommended methods of their application and thickness.
c. How to use adhesive bonding materials.
d. How to select and apply sealants and anti-corrosion materials.
e. The properties and different types of materials used in the construction of vehicle bodies.

Removing and replacing vehicle body panels

a. The principles governing how unitary and separate chassis vehicle bodies are constructed.
b. How to identify and remove spot and gas shielded arc welds to meet manufacturer's and current Industry Standards.
c. How to identify the difference between manufacturer's processes and repair processes.
d. The principles of resistance spot welding, gas shielded arc plug welding, gas shielded arc welding and gas shielded brazing.
e. Correct procedures for the removal and replacement of vehicle body panels.
f. The manufacturer's approved methods of working for the removal and replacement of vehicle body panels.
g. The different types of mechanical fixings for vehicle body panels and when and why they should be used.

h. The repair and welding implications of working with:
    i. high strength steels (HSS)
    ii. low carbon steels (LCS)
    iii. aluminium alloys
    iv. galvanized coatings
    v. Boron steels
    vi. TRIP
    vii. TWIP
    viii. laminated.
i. How panel removal and refitting affects the overall body structure of the vehicle.
j. The cause and rectification of distortion resulting from welding.
k. How to find, interpret and use sources of information relevant to the removal and replacement of vehicle body panels and assemblies.
l. How to remove and replace vehicle body panels and assemblies.
m. How to remove and replace door skins.
n. How to establish cut lines for partial panel replacement.
o. How to prepare all edges to be joined.
p. How to select the correct joints and joining process to match the repair area.
q. The importance and implications of panel clamping and alignment to match existing contours and gaps.
r. How to test spot weld strength.
s. How to load a vehicle onto a jig system to ensure correct alignment and positioning of new panels.
t. How to remove and replace safety restraint systems (SRS) using the manufacturer's approved method.
u. How to work safely avoiding damage to the vehicle and its systems.
v. The importance and implications of checking accuracy of repair work.
w. The types of quality control checks that can be used to ensure correct alignment and contour of panels and the operation of components to manufacturer's specification.
x. The method of storing removed panels and the importance of storing them correctly.

Unit 164 Knowledge of motor vehicle body panel major repairs

Level:	**6**
Credit value:	6
Relationship to NOS:	This unit is linked to NOS BP14 – Repair Motor Vehicle Body Panels.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of carrying out repairs to motor vehicle body panels using a variety of techniques.

Learning outcome	**The learner will:**
1. understand the principles of selection and use of appropriate tools and equipment in major repairs to motor vehicle body panels	
Assessment criteria	
The learner can: 1.1 identify tools used in the repair of metal finishing and plastic repairs 1.2 identify tools used in hydraulic reforming equipment including specialist pulling systems 1.3 explain how to prepare, test, use and maintain the hand and power tools required to repair vehicle body panels 1.4 explain how to adapt hydraulic push equipment to perform pulling operations.	

Learning outcome	**The learner will:**
2. understand material types and properties used in repairing motor vehicle body panels	
Assessment criteria	
The learner can: 2.1 identify and describe the properties and different types of materials involved in the construction of the vehicle in the areas that will be worked on during repair 2.2 explain the types and selection of filling materials, their preparation and application 2.3 identify the properties and safe use of types of filling materials used to repair panels 2.4 explain how to mix and apply plastic fillers	

2.5	identify and explain the different types and grades of abrasive paper and their use
2.6	explain the principles of chassis frame and monocoque vehicle construction
2.7	describe the techniques for identifying the type of plastic used for manufactured components.

Learning outcome	**The learner will:**
3. understand how to carry out repairs to motor vehicle body panels	
Assessment criteria	
The learner can:	
3.1	explain how to asses the extent of damage, including corrosion damage
3.2	explain how body panel and component damage can affect other panels and the operation of vehicle systems
3.3	identify the factors determining the use of specific preparation and repair methods
3.4	explain the implications of working and joining mild, high, ultra high strength steels, aluminium alloys and galvanised coatings
3.5	explain the principles associated with hot and cold shrinking
3.6	explain how heat can assist in reforming panels but also affect the properties of the steel
3.7	explain the consequences of using inappropriate repair methods
3.8	identify the causes and rectification of distortion resulting from welding
3.9	explain how to prepare the vehicle to avoid contamination
3.10	describe how to prepare damaged areas to facilitate repairs
3.11	describe how to prepare the panel surface prior to filling
3.12	explain how to repair corrosion damage
3.13	explain how to repair and reinstate vehicle body panel contours and components
3.14	describe the methods used to check for panel contours for accuracy after reshaping
3.15	explain the procedures for reinstating anti corrosion, sealant and sound deadening materials
3.16	describe how to finish repairs to a suitable agreed condition to enable the next stage of repairs to proceed
3.17	identify the specification for panel shapes, dimensions and tolerances for the vehicles worked upon
3.18	identify the types of quality control checks that can be used to ensure the correct contour and standard of finish
3.19	describe the aspects of pedestrian safety in relation to the reparability of vehicles.

Unit 164 Knowledge of motor vehicle body panel major repairs

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Selection and use of tools and equipment

a. The principle governing the selection and use of hand tools for metal finishing and plastic repairs.
b. The factors governing the selection and use of panel beating and hydraulic reforming equipment, including specialist pulling systems.
c. How to prepare, test, use and maintain the tools and equipment required to repair vehicle body panels.
d. How to adapt hydraulic push equipment to perform pulling operations.

Selection and use of materials

a. The types and selection of filling materials, their preparation and application.
b. The properties, types, grades and use of abrasives used in vehicle body panel repair process.
c. The properties and safe use of types of filling materials used to repair panels including:
    i. plastic fillers
    ii. body solder.
d. How to mix and apply plastic fillers.

Repairing vehicle bodies

a. How to prepare the vehicle to avoid contamination.
b. How to assess the extent of damage, including corrosion damage.
c. How unitary vehicle bodies and cabs are constructed.
d. The principles of resistance spot welding, gas shielded arc plug welding and gas shielded arc brazing.
e. How body panels and component damage can affect other panels and the operation of vehicle systems.
f. The factors determining the use of specific preparation and repair methods.
g. The repair and welding implications of working with:
    i. high strength steels (HSS)
    ii. low carbon steels (LCS)
    iii. aluminium alloys
    iv. galvanized coatings
    v. Boron steels
    vi. TRIP
    vii. TWIP

viii. laminated.

h. The consequences of using inappropriate repair methods.
i. How heat can be used to assist reforming.
j. How heating can affect the properties of steels.
k. The techniques for identifying the type of plastics used for manufactured components.
l. The procedures for reinstating anti-corrosion, sealant and sound deadening materials.
m. The causes and rectification and distortion resulting from welding.
n. The manufacturer's approved methods of working for the preparation and repair of vehicle body panels.
o. The specification of panel shapes, dimensions and tolerances for the vehicle worked on.
p. The type of quality control checks that can be used to ensure the correct contour and standard of finish.
q. How to interpret and use sources of information relevant to the repair of vehicle body panels and components.
r. How to prepare damaged areas to facilitate repairs.
s. How to repair corrosion damaged panels.
t. How to remove protective materials.
u. How to repair and reinstate vehicle body panel contours and components using:
    i. body filling operations
    ii. metal finishing
    iii. plastic filling
    iv. panel beating
    v. panel shrinking
    vi. hydraulic reforming
    vii. specialist dent removal tools
    viii. spot welding
    ix. gas shielded arc welding
    x. gas shielded arc brazing.
v. The techniques of reshaping damaged vehicle body panels using hand and specialist tools.
w. How to check the accuracy of reinstated vehicle body panel shapes.
x. How to finish repairs to a suitable condition for handing on to the painting stage.
y. How to work safely avoiding damage to the vehicle and its systems.

Repairs are:

a. Correction of severely distorted panels.
b. Assessing panel damage.
c. Splits on metal panels, using relevant joining techniques.
d. Fractures on plastic panels.

Vehicle panels are:

a. Non-permanently fixed exterior panels.
b. Permanently fixed exterior panels.
c. Sub-structure components:
    i. bonded panel
    ii. TRIP
    iii. TWI
    iv. Laminated.

Unit 167 Knowledge of identifying and rectifying motor vehicle body misalignment

Level:	**6**
Credit value:	6
Relationship to NOS:	This unit is linked to NOS BP17 – Identify and Rectify Motor Vehicle Body Misalignment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of how to identify and rectify motor vehicle body misalignment.

Learning outcome	**The learner will:**
1. understand the principles of selection and use of appropriate tools and equipment in identifying and rectifying motor vehicle body misalignment	
Assessment criteria	
The learner can: 1.1 identify the constraints the type of vehicle construction places on the choice of repair equipment 1.2 identify the tools and equipment used in the repair of vehicle body misalignment 1.3 explain how to prepare, test and adjust the equipment required for misalignment rectification 1.4 explain how to install vehicles on misalignment rectification equipment, including the use of lifting equipment 1.5 explain how to use rectification equipment including hand and power tools, safety chains, hydraulic push and pull and body alignment jigs (bracket system and or measuring system) 1.6 explain how to use clamps, restraints and supports to minimise additional damage during the repair.	

Learning outcome	The learner will:
2. understand how to identify and rectify motor vehicle body misalignment	
Assessment criteria	
The learner can: 2.1 describe the properties of vehicle body construction materials 2.2 compare the materials used in the construction of vehicle bodies 2.3 compare chassis frame and monocoque vehicle construction 2.4 explain the principles of damage assessment and identification of direct and indirect damage 2.5 describe the function of pulling systems and the criteria used for their selection 2.6 identify the geometric principles of alignment in the absence of a data sheet 2.7 use sources of information relevant to the rectification of vehicle bodies 2.8 identify the extent of the damage or misalignment using measuring equipment and or a measuring system 2.9 explain how to realign vehicles to the manufacturer's original specification 2.10 explain the importance of following manufacturer's/research repair methods, instructions and data sheets 2.11 state the possible consequences of failing to follow the manufacturer's repair methods, instructions and data sheets.	

Unit 167 Knowledge of identifying and rectifying motor vehicle body misalignment

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Selection and use of tools and equipment

a. The constraints the type of vehicle places on the choice of repair equipment.
b. How to prepare, test and adjust all equipment required for misalignment rectification.
c. How to install vehicles on misalignment rectification equipment, including the use of lifting equipment.
d. How to use rectification equipment including:
    i. hand and power tools
    ii. safety chains
    iii. hydraulic push and pull
    iv. body jigs (bracket system and/or measuring system).
e. The correct use of clamps, restraints and supports to minimise additional damage during repair.

Realignment of vehicles

a. The principle of chassis frame and monocoque vehicle construction.
b. The principle of damage assessment and identification of direct and indirect damage.
c. The function of the pulling system and the criteria for selection:
    i. Vector
    ii. pull arm
    iii. tower system
    iv. floor mounted
    v. bench mounted.
d. How to use geometric principles of alignment in the absence of data sheets.
e. The properties of vehicle body construction materials.
f. How to find, interpret and use sources of information relevant to the rectification of vehicle misalignment.
g. How to establish the extent of misalignment using measuring equipment and/or measuring system.
h. How to realign vehicles to the manufacturers' original specification.
i. How to work safely avoiding damage to vehicles, personal injury and injury to colleagues.

j. The importance of following manufacturers' instructions and using their approved methods of working (including use of materials and equipment).
k. The consequences of failing to follow manufacturers' instructions and data sheets.

Rectification activities are:

a. Visual examination.
b. Setting up.
c. Measurement in conjunction with alignment measuring equipment.
d. Realignment using pulling equipment.

Unit 169 Knowledge of motor vehicle body metal active gas shielding (MAGS) welding techniques

Level:	**5**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP19 – Motor Vehicle Body MIG/MAG Welding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of joining carbon steels using Metal Active Gas (MAG) welding techniques.

Learning outcome	**The learner will:**
1.	understand how to work safely when carrying out motor vehicle body MAG welding operations
Assessment criteria	
The learner can:	
1.1	describe the health, safety and legal requirements relating to the joining of carbon steels using MAG welding techniques
1.2	describe the importance of selecting, using and maintaining the appropriate personal protective equipment when joining carbon steels using MAG welding techniques
1.3	describe the requirements for protecting the vehicle and contents from damage before, during and after the joining of carbon steels by MAG welding techniques.

Learning outcome	**The learner will:**
2.	understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body MAG welding operations
Assessment criteria	
The learner can:	
2.1	explain the use of all tools and equipment required to join carbon steels using MAG welding techniques
2.2	describe, within the scope of their responsibilities, how to select, prepare and maintain the tools and equipment required to join carbon steels using MAG welding techniques.

Learning outcome	The learner will:
3. understand how to carry out motor vehicle body MAG welding operations	
Assessment criteria	
The learner can: 3.1 explain the importance of correct surface preparation methods to ensure a good MAG weld is achieved 3.2 identify the need for correct alignment and mating of carbon steels and the methods used to achieve this in MAG welding 3.3 describe the welding techniques used in MAG welding to include: a. plug b. lap c. butt d. fillet 3.4 identify the faults and defects that can occur when MAG welding 3.5 identify common causes which result in faults and defects 3.6 describe the quality control measures that can be used to help ensure correct joining of carbon steels before, during and after the welding process 3.7 describe how to inspect and assess MAG welding in accordance to Industry Standards 3.8 compare the advantages and disadvantages of MAG welding over other welding methods 3.9 explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process.	

Unit 169 Knowledge of motor vehicle body metal active gas shielding (MAGS) welding techniques

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

a. The safe working practices and procedures to be observed when working with MAGS or cored wire arc welding equipment (general workshop and site safety; appropriate personal protective equipment; fire prevention; protecting other workers from the effects of the welding arc; safety in enclosed/confined spaces; fume control; accident procedure; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials).

b. The correct handling and storage of gas cylinders (manual handling and use of cylinder trolley, leak detection procedures, relevant BCGA codes of practice, cylinder identification, gas pressures, cylinder and equipment safety features, emergency shutdown procedures).

c. The hazards associated with arc welding (live electrical components; current return (earth return); the electric arc; fumes and gases; gas supply leaks; spatter, hot slag and metal; elevated working; enclosed spaces; slips, trips and falls), and how they can be minimised.

d. The manual, MAGS or cored wire arc welding process (principles of fusion welding, AC and DC power sources, ancillary equipment, power ranges, care of equipment).

e. The consumables associated with MAGS or cored wire arc welding (types of wire and their application [solid and cored], types of shielding gas and their application, gas supply and control).

f. The types of welded joints to be produced (fillet and butt welds, single and multi-run welds, sheet and sections; welding positions).

g. Setting up and restraining the joint (the use of jigs and fixtures, manipulators and positioners, restraining devices, tack welding size and spacing in relationship to material thickness).

h. Preparing the welding equipment and checks that need to be made to ensure that it is safe and ready to use (electrical connections, power return and current return [earth return]; wire feed mechanisms, gas supply, setting welding parameters, correct joint set-up, cleanliness of materials used; calibration before use; routine care and maintenance of equipment).

i. The techniques of operating the welding equipment to produce a range of joints in the various joint positions (fine tuning parameters,

correct manipulation of the welding gun, safe closing down of the welding equipment).

j. The importance of complying with job instructions and the welding procedure specification.

k. Problems that can occur with the welding activities and how these can be overcome (causes of distortion and methods of control, effects of welding on materials and sources of weld defects; methods of prevention).

l. The importance and usage of organisational quality systems used and weld standards to be achieved; weld inspection and test procedures used (including visual and non-destructive tests).

m. Personal approval tests, and their applicability to your work.

n. The extent of your own authority and whom you should report to if you have problems that you cannot resolve.

o. Reporting lines and procedures, line supervision and technical experts.

Unit 170 Knowledge of motor vehicle body resistance spot welding operations

Level:	**5**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP20 – Motor Vehicle Body Resistance Spot Welding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop the knowledge in order to join materials using resistance spot welding techniques and procedures.

Learning outcome	**The learner will:**
1.	understand how to work safely when carrying out motor vehicle body resistance spot welding operations
Assessment criteria	
The learner can:	
1.1	describe the health, safety and legal requirements relating to the joining of materials using resistance spot welding techniques
1.2	describe the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using resistance spot welding techniques
1.3	describe the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by resistance spot welding techniques.

Learning outcome	**The learner will:**
2.	understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body resistance spot welding operations
Assessment criteria	
The learner can:	
2.1	identify and explain the use of all tools and equipment required to join materials using resistance spot welding techniques
2.2	describe, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using resistance spot welding techniques.

Learning outcome	The learner will:
3. understand how to carry out motor vehicle body resistance spot welding operations	
Assessment criteria	
The learner can: 3.1 describe the importance of correct surface preparation methods to ensure a good resistance spot weld is achieved 3.2 identify the need for alignment and mating of materials and the best methods used to achieve this in resistance spot welding 3.3 describe the welding processes, techniques and joints used for the joining of materials using resistance spot welding 3.4 identify the faults and defects that can occur when carrying out resistance spot welding 3.5 identify common causes which produce the faults and defects in resistance spot welding 3.6 describe the types of quality control checks that can be used to ensure correct joining of materials 3.7 describe how to inspect and assess resistance spot welding in accordance to Industry Standards including: a. weld pitch b. indentation c. heat zone d. nugget size e. peel and shear test 3.8 compare the advantages and disadvantages of resistance spot welding over other welding methods 3.9 explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process.	

Unit 170 Knowledge of motor vehicle body resistance spot welding operations

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

a. The specific safety precautions to be taken when operating resistance welding installations (working with machinery; the use of appropriate personal protective equipment machine guards; operation of machine safety devices; stopping the machine in an emergency; closing down the machine on completion of the welding activities; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials), any regulations relating to EMF (Electric Magnetic Field).
b. The hazards associated with resistance welding machines (dangers from live internal electrical components, fumes, hot metal, expulsion of hot particles, moving parts of machines), and how they can be minimised.
c. The principles of resistance welding; terminology used in welding.
d. Mechanised and automated welding (types of installation; machine functions; control systems; safety features).
e. The key components and features of the equipment used (power source; electrical parameters such as arc voltage, current, electrode pressure and welding time; systems for parameter control; how variation in the parameters influence weld features, quality and output).
f. Extracting the information required from drawings and welding procedure specifications.
g. Operation of the machine controls and their function; clamping of components and equipment care procedures.
h. Setting up and aligning the work piece.
i. Monitoring the welding process; recognition of problems, and action to be taken.
j. Problems that can occur with the welding activities, materials and weld defects.
k. Self inspection of completed work.
l. Organisational quality systems (standards to be achieved; production records to be kept).
m. Personal approval tests and their applicability to your work.
n. The extent of your own authority and whom you should report to if you have problems that you cannot resolve.
o. Reporting lines and procedures, line supervision and technical experts.

p. The requirements of the power supply to the unit and the use of extension cables.

Unit 171 Knowledge of motor vehicle body metal inert gas (MIG) brazing operations

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP21 – Motor Vehicle Body MIG Brazing Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of joining materials using Metal Inert Gas brazing operations techniques and procedures.

Learning outcome	**The learner will:**
1.	understand how to work safely when carrying out motor vehicle body MIG brazing operations
Assessment criteria	
The learner can:	
1.1	explain the health, safety and legal requirements relating to the joining of materials using MIG brazing operations
1.2	explain the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using MIG brazing operations
1.3	explain the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by MIG brazing operations.

Learning outcome	**The learner will:**
2.	understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body MIG brazing operations
Assessment criteria	
The learner can:	
2.1	explain the use of all tools and equipment required to join materials using MIG brazing operations
2.2	explain, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using MIG brazing operations.

Learning outcome	The learner will:
3. understand how to carry out motor vehicle body MIG brazing operations	
Assessment criteria	
The learner can: 3.1 explain the importance of correct surface preparation methods to ensure a good MIG brazing operation is achieved 3.2 identify the correct need for alignment/mating of materials and the best methods used to achieve this in MIG brazing operations 3.3 explain the welding processes, techniques and joints used for the joining of materials using MIG brazing operation, joints include: a. lap slot b. lap seam c. butt joint 3.4 identify the faults and defects that can occur when carrying out MIG brazing operation 3.5 identify common causes which produce the faults and defects in MIG brazing operation 3.6 describe the types of quality control checks that can be used to ensure correct joining of materials 3.7 describe how to inspect and assess MIG brazing operation in accordance to Industry Standards 3.8 explain the advantages and disadvantages of MIG brazing operation over other welding methods 3.9 explain the importance and implications of checking and carrying out brazing test pieces prior to carrying out the brazing process.	

Unit 171 Knowledge of motor vehicle body metal inert gas (MIG) brazing operations

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

a. The safe working practices and procedures to be observed when operating brazing installations (working with machinery; the use of appropriate personal protective equipment; machine guards; operation of machine safety devices; stopping the machine in an emergency; closing the machine down on completion of activities; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials).
b. The hazards associated with MIG brazing machines (dangers from relevant equipment sources; fumes and gases; hot metal; moving parts of machinery), and how they can be minimised.
c. Principles of the relevant brazing process; terminology used in brazing.
d. The key components and features of the equipment.
e. How to extract the information required from drawings and brazing procedure specifications.
f. Operation of the machine controls and their function; care of equipment; control and storage of consumables.
g. Setting up and aligning the work pieces.
h. Monitoring the installation during the brazing process; recognition of problems, and action to be taken.
i. Problems that can occur with the brazing activities, materials, filler metals and joint defects.
j. Self inspection of completed work.
k. Organisational quality systems (standards to be achieved; production records to be kept).
l. Personal approval tests and their applicability to your work.
m. The extent of your own authority and whom you should report to if you have problems that you cannot resolve.
n. Reporting lines and procedures, line supervision and technical experts.

Unit 172 Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP22 – Motor Vehicle Body Aluminium Welding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of joining materials using aluminium Metal Inert Gas (MIG) welding techniques and procedures.

Learning outcome	**The learner will:**
1.	understand how to work safely when carrying out motor vehicle body aluminium MIG welding operations
Assessment criteria	
The learner can:	
1.1	explain the health, safety and legal requirements relating to the joining of materials using aluminium MIG welding techniques
1.2	explain the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using MIG aluminium welding techniques
1.3	explain the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by aluminium MIG welding techniques.

Learning outcome	The learner will:
2. understand how to carry out motor vehicle body aluminium MIG welding operations	
Assessment criteria	
The learner can: 2.1 explain the importance of correct surface preparation methods to ensure a good aluminium MIG weld is achieved 2.2 identify the correct need for alignment/mating of materials and the best methods used to achieve this in aluminium MIG welding 2.3 explain the welding processes, techniques and joints used for the joining of materials using aluminium MIG welding, joints include: a. lap seam b. butt joint c. fillet joint 2.4 identify the faults and defects that can occur when carrying out aluminium MIG welding 2.5 identify common causes which produce the faults and defects in aluminium MIG welding 2.6 explain the types of quality control checks that can be used to ensure correct joining of materials including: a. dye penetrate b. crack tests 2.7 explain how to inspect and assess aluminium MIG welding in accordance to Industry Standards 2.8 explain the advantages and disadvantages of aluminium MIG welding over other welding methods 2.9 explain how to ensure cross contamination does not occur and the effect of cross contamination on aluminium 2.10 explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process.	

Learning outcome	The learner will:
3. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body aluminium MIG welding operations	
Assessment criteria	
The learner can: 3.1 explain the use of all tools and equipment required to join materials using aluminium MIG welding techniques 3.2 explain, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using aluminium MIG welding techniques.	

Unit 172 Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

a. The safe working practices and procedures to be observed when working with aluminium welding equipment (general workshop and site safety; appropriate personal protective equipment; fire prevention; protecting other workers from the effects of the electric arc; safety in enclosed/confined spaces; fume control; accident procedure; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials).

b. The hazards associated with aluminium welding (live electrical components; current return [earth return] arrangements; the electric arc; fumes and gases; gas supply leaks; spatter; hot slag and metal; grinding and mechanical metal/slag removal; elevated working; enclosed spaces; slips, trips and falls), and how they can be minimised.

c. The correct handling and storage of gas cylinders (manual handling and use of cylinder trolley, leak detection procedures, relevant BCGA codes of practice, cylinder identification, gas pressures, cylinder and equipment safety features, emergency shutdown procedures).

d. The manual MIG welding process (principles of fusion welding; power sources; ancillary equipment; power ranges; arc initiation system; care and maintenance of equipment).

e. The consumables associated with MIG welding (types of filler wire, types of shielding gas, welding electrodes, gas supply and control, control and storage of consumables).

f. The types of welded joints to be produced (fillet and butt welds, single and multi-run welds, sheet and sections; welding positions).

g. Setting up and restraining the joint (confirming correct set-up of joint; cleanliness of materials used; the use of jigs and fixtures, manipulators and positioners, restraining devices; tack welding size and spacing in relationship to material thickness).

h. Preparing the equipment, and checks that need to be made to ensure that it is safe to use (condition of electrical connections, power return and current return [earth return] arrangements, operating parameters).

i. The techniques of operating the welding equipment to produce a range of joints in the various joint positions (fine tuning parameters, correct manipulation of torch, safe closing down of the welding equipment).

j. The importance of complying with job instructions and the welding procedure specification.

k. Problems that can occur with the welding activities and how these can be overcome (causes of distortion and methods of control, effects of welding on materials and sources of weld defects; methods of prevention).

l. The organisational quality systems used and weld standards to be achieved; weld inspection and test procedures used (including visual and non-destructive tests).

m. Personal approval tests and their applicability to your work.

n. The extent of your own authority and whom you should report to if you have problems that you cannot resolve.

o. Reporting lines and procedures, line supervision and technical experts.

Unit 173 Knowledge of motor vehicle body tungsten inert gas (TIG) welding operations

Level:	**6**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP23 – Motor Vehicle Body TIG Welding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of joining materials using Tungsten Inert Gas (TIG) welding techniques and procedures.

Learning outcome	**The learner will:**
1. understand how to work safely when carrying out motor vehicle body TIG welding operations	
Assessment criteria	
The learner can: 1.1 explain health, safety and legal requirements relating to the joining of materials using TIG welding techniques 1.2 explain the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using TIG welding techniques 1.3 explain the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by TIG welding techniques.	

Learning outcome	The learner will:
2. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body TIG welding operations	
Assessment criteria	
The learner can: 2.1 explain the use of all tools and equipment required to join materials using TIG welding techniques 2.2 explain within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using TIG welding techniques.	

Learning outcome	The learner will:
3. understand how to carry out motor vehicle body TIG welding operations	
Assessment criteria	
The learner can: 3.1 explain the importance of correct surface preparation methods to ensure a good TIG weld is achieved 3.2 identify the need for alignment and mating of materials and the best methods used to achieve this in TIG welding 3.3 identify and describe the welding processes, techniques and joints used for the joining of materials using TIG welding, joints include: a. lap seam b. butt joint c. fillet joint 3.4 identify the faults and defects that can occur when carrying out TIG welding 3.5 identify common causes which produce the faults and defects in TIG welding 3.6 explain the types of quality control checks that can be used to ensure correct joining of materials 3.7 explain how to inspect and assess TIG welding in accordance to Industry Standards 3.8 explain the advantages and disadvantages of TIG welding over other welding methods 3.9 explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process.	

Unit 173 Knowledge of motor vehicle body tungsten inert gas (TIG) welding operations

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

a. The safe working practices and procedures to be observed when working with TIG or Plasma-arc welding equipment (general workshop and site safety; appropriate personal protective equipment; fire prevention; protecting other workers from the effects of the electric arc; safety in enclosed/confined spaces; fume control; accident procedure; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials).

b. The hazards associated with arc welding (live electrical components; current return [earth return]; the electric arc; fumes and gases; gas supply leaks; spatter; hot slag and metal; grinding and mechanical metal/slag removal; elevated working; enclosed spaces; slips, trips and falls), and how they can be minimised.

c. The correct handling and storage of gas cylinders (manual handling and use of cylinder trolley, leak detection procedures, relevant BCGA codes of practice, cylinder identification, gas pressures, cylinder and equipment safety features, emergency shutdown procedures).

d. The manual TIG or Plasma-arc welding process (principles of fusion welding; power sources; ancillary equipment; power ranges; arc initiation system; care and maintenance of equipment).

e. The consumables associated with TIG or Plasma-arc welding (types of filler wire, types of shielding gas, welding electrodes, gas supply and control, control and storage of consumables).

f. The types of welded joints to be produced (fillet and butt welds, single and multi-run welds, sheet and sections; welding positions).

g. Setting up and restraining the joint (confirming correct set-up of joint; cleanliness of materials used; the use of jigs and fixtures, manipulators and positioners, restraining devices; tack welding size and spacing in relationship to material thickness).

h. Preparing the equipment, and checks that need to be made to ensure that it is safe to use (condition of electrical connections, power return and earthing arrangements, operating parameters).

i. The techniques of operating the welding equipment to produce a range of joints in the various joint positions (fine tuning parameters, correct manipulation of torch, safe closing down of the welding equipment).

j. The importance of complying with job instructions and the welding procedure specification.

k. Problems that can occur with the welding activities and how these can be overcome (causes of distortion and methods of control, effects of welding on materials and sources of weld defects; methods of prevention).

l. The organisational quality systems used and weld standards to be achieved; weld inspection and test procedures used (including visual and non-destructive tests).

m. Personal approval tests and their applicability to your work.

n. The extent of your own authority and whom you should report to if you have problems that you cannot resolve.

o. Reporting lines and procedures, line supervision and technical experts.

Unit 174 Knowledge of motor vehicle body mechanical fastening operations

Level:	**5**
Credit value:	2
Relationship to NOS:	This unit is linked to NOS BP24 – Motor Vehicle Body Mechanical Fastening Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of joining materials using mechanical fastening techniques and procedures.

Learning outcome	**The learner will:**
1. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body mechanical fastening operations.	
Assessment criteria	
The learner can: 1.1 explain the use of all tools and equipment required to join materials using mechanical fastening operations 1.2 explain, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using mechanical fastening operations.	

Learning outcome	**The learner will:**
2. understand how to carry out motor vehicle body mechanical fastening operations	
Assessment criteria	
The learner can: 2.1 describe the importance of correct surface preparation methods to ensure a good mechanical fastening is achieved 2.2 identify the correct need for alignment and mating of materials and the best methods used to achieve this in mechanical fastening operations 2.3 explain the mechanical fastening processes, techniques and joints used for the joining of materials, joints include: a. riveting (single sided, double sided and self piercing)	

	b. clinching c. bolts and fasteners d. screwing (self threading and self piercing) e. hybrid joining (combinations of techniques listed that may also include adhesives)
2.4	explain how different materials used in the construction of motor vehicles react with each other
2.5	identify the faults and defects that can occur when carrying out mechanical fastening operations
2.6	identify common causes which produce the faults and defects in mechanical fastening operations
2.7	explain the types of quality control checks that can be used to ensure correct joining of materials
2.8	explain how to use adhesives with riveting techniques
2.9	explain the advantages and disadvantages of mechanical fastening operations over other joining methods.

Unit 174 Knowledge of motor vehicle body mechanical fastening operations

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

a. The hazards associated with the joining operations (such as handling sheet/fabricated components, using hot metal riveting techniques, handling and using sealants and cleaning agents, dangerous or badly maintained tools and equipment), and how they can be minimised.
b. How to obtain the necessary drawings and joining procedure specifications.
c. How to extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards in relation to work undertaken).
d. The use of manufacturers' specifications for the types of fasteners used.
e. The various joining processes that are used, and the tools and equipment required.
f. The preparations to be carried out on the materials/components prior to joining them (such as materials to be degreased, dry and clean, with holes and flanges de-burred).
g. How to set up and align the joints prior to fixing, and the tools and methods that can be used (such as clamps, rivet gripping tools, temporary fixings, jacking and supporting devices).
h. How to produce a secure joint using blind rivets, and the type of riveting tools that are available.
i. The range of bolts and screwed fasteners that are to be used; why it is important to use the correct type of washer; sequence of tightening bolts on flanged joints; and the tools and equipment used to ensure they are tightened to the required torque.
j. Checks to be carried out on the tools and equipment prior to use to ensure that they are in a safe and useable condition (such as condition of plugs and leads on power tools, condition of striking faces on hammers, condition of riveting tools).
k. Equipment setting, operating and care procedures; why equipment and tools need to be correctly set up and in good condition.
l. The importance of using the tools only for the purpose intended; the care that is required when using the equipment and tools; the proper way of preserving and storing tools and equipment between operations.
m. The things that can go wrong with the joining operations, and how these can be avoided.

n. The extent of your own authority and whom you should report to if you have problems that you cannot resolve.

o. Reporting lines and procedures, line supervision and technical experts.

Unit 175 Knowledge of motor vehicle body adhesive bonding operations

Level:	**5**
Credit value:	2
Relationship to NOS:	This unit is linked to NOS BP25 – Motor Vehicle Body Adhesive Bonding Operations.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of joining materials using adhesive bonding techniques and procedures.

Learning outcome	**The learner will:**
1. understand how to work safely when carrying out motor vehicle body adhesive bonding operations	
Assessment criteria	
The learner can: 1.1 explain the health, safety and legal requirements relating to the joining of materials using adhesive bonding techniques 1.2 explain the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using adhesive bonding techniques 1.3 explain the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by adhesive bonding techniques.	

Learning outcome	The learner will:
2. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body adhesive bonding operations	
Assessment criteria	
The learner can: 2.1 explain the use of all tools and equipment required to join materials using adhesive bonding techniques 2.2 explain, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using adhesive bonding techniques.	

Learning outcome	The learner will:
3. understand how to carry out motor vehicle body adhesive bonding operations	
Assessment criteria	
The learner can: 3.1 explain the importance of correct surface preparation methods to ensure a good adhesive bonding joint is achieved 3.2 identify the need for alignment/mating of materials and the best methods used to achieve this in adhesive bonding 3.3 explain the joining processes, techniques and joints used for the joining of materials using adhesive bonding 3.4 identify the faults and defects that can occur when carrying out adhesive bonding 3.5 identify common causes which produce the faults and defects in adhesive bonding 3.6 explain the types of quality control checks that can be used to ensure correct joining of materials 3.7 explain the advantages and disadvantages of adhesive bonding over other joining methods 3.8 explain the importance and implications of checking and carrying out test pieces prior to carrying out the joining process.	

Unit 175 Knowledge of motor vehicle body adhesive bonding operations

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

a. The specific safety precautions to be taken when bonding engineering materials using adhesives in a fabrication environment (general workshop and site safety, appropriate personal protective equipment, accident procedure; statutory regulations, risk assessment procedures and COSHH regulations).
b. The personal protective clothing and equipment to be worn when carrying out bonding as part of the fabrication activities (gloves, eye protection, respiratory protection, etc).
c. The importance of good workshop practice and house keeping, ventilation and fume control equipment, first aid procedures and actions, hazardous substances and relevant sections of COSHH.
d. The hazards associated with bonding fabricated components, and how they can be minimised.
e. How to obtain the necessary drawings and joining specifications.
f. How to extract information from research repair methodology in relation to the work undertaken.
g. Types of adhesives:
    i. compact
    ii. two parts
    iii. cyanoacrylate
    iv. anerobic
    v. sealants
    vi. toughened.
h. Knowledge of curing mechanisms including:
    i. moisture/solvent evaporation
    ii. chemical/thermal reaction
    iii. exposure/exclusion to oxygen.
i. Understanding the importance of recording shelf life, pot life, setting and curing times
j. Knowledge of adhesion and cohesion.
k. The material preparations that are required, and the equipment and consumables that are used.
l. The importance of working to organisational and bonding agent manufacturers' instructions whilst carrying out the bonding activities.
m. The methods and techniques used for bonding the materials (such as gluing, impact, chemical and thermal reaction techniques).

n. The characteristics of the adhesives that are to be used.
o. The application of, and precautions to be taken when using, adhesives and solvents.
p. Maintenance and care of tools and equipment.
q. Methods of degreasing components and producing a keying surface.
r. Type and suitability of adhesives, setting or curing requirements and time, strength and appearance.
s. Common causes of defects associated with the bonding processes, and how to avoid them.
t. The effects of the environment on the bonding process (such as temperature humidity, cleanliness).
u. How to identify, select, use, and clean, the appropriate bonding agent holding vessels, brushes, stirrers and spatulas, scrapers, knives, clamps and weights.
v. The importance of cleaning up after use, to ensure everything can be used again and to minimise the need for replacement of equipment.
w. Reasons for checking that components are assembled in the correct sequence, are positioned dimensionally accurately and to the correct orientation, in accordance with the specifications, prior to bonding.
x. How to check that completed joints are firm, sound and fit for purpose.
y. Procedures for cleaning off surplus adhesive and tidying up the appearance of joints.
z. The extent of your own authority and whom you should report to if you have problems that you cannot resolve.
aa. Reporting lines and procedures, line supervision and technical experts.

Unit 176 Knowledge of motor vehicle construction and materials

Level:	**5**
Credit value:	2
Relationship to NOS:	This unit is linked to NOS BP26 – Knowledge of Motor Vehicle Construction and Materials.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements.
Aim:	This unit enables the learner to develop an understanding of types of metals and composites used in the construction of motor vehicles, the areas where these materials are used and what their properties are. It is also about the design and construction techniques used in the vehicle body and chassis.

Learning outcome	**The learner will:**
1. understand material types and properties used in motor vehicle construction	
Assessment criteria	
The learner can: 1.1 describe the properties and different types of materials used in the construction of vehicle bodies including: a. mild steel b. ultra high strength steel c. aluminium alloys d. stainless steel e. plastics f. composites g. trim materials 1.2 identify the types of materials used in the construction of vehicle bodies and chassis components 1.3 explain the properties of materials used in vehicle body construction 1.4 describe how different materials used in the construction of motor vehicles react with each other 1.5 describe the importance of cleanliness and avoiding cross contamination when working with different materials 1.6 describe the importance of selecting and using the appropriate joining techniques for the type of material.	

Learning outcome	The learner will:
2. understand how the different types of materials and formation methods affect the construction of motor vehicle bodies	
Assessment criteria	
The learner can: 2.1 explain the principles of chassis frame and monocoque vehicle construction 2.2 identify the different types of cassis designs used for modern vehicles, including commercials 2.3 explain the affects on strength once the overall body structure is complete 2.4 identify the different body and chassis components that are made using different materials, including the advantages and disadvantages 2.5 describe how crumple zones affect the safety, design, cost and construction of motor vehicle bodies and chassis 2.6 describe how the type of material used affects the safety, design, cost and construction of motor vehicle bodies and chassis 2.7 identify the implications of recycling of vehicle bodies and chassis components, now and in the future.	

Learning outcome	The learner will:
3. understand how damage to the construction of a motor vehicle will affect its safety	
Assessment criteria	
The learner can: 3.1 describe how to carry out a vehicle inspection to assess for damage 3.2 describe how to check a vehicle for correct alignment 3.3 describe how manipulation of the vehicle body and chassis will affect its residual strength.	

Unit 176 Knowledge of motor vehicle construction and materials

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Common forms in which body repair materials are supplied

a. Identify the common forms of supply of metals to include:
    i. sheet
    ii. roll
    iii. bar
    iv. section.
b. Identify common forms of supply for non metals:
    i. solid
    ii. liquid
    iii. composites
    iv. laminated.

Mechanical properties and use examples of materials to illustrate these properties

a. Define the three states of matter.
b. State the definitions of the following mechanical properties:
    i. ductility
    ii. malleability
    iii. hardness
    iv. toughness
    v. elasticity
    vi. plasticity
    vii. weld ability
    viii. conductivity
    ix. insulation.
c. Give examples of materials and components exhibiting the above properties.
d. Describe ways in which the above properties can be changed temporarily or permanently to include:
    i. heating
    ii. alloying
    iii. cold working
    iv. heat treatments.

Define and distinguish between classes of materials

a. Define classes of materials as:
    i. metals

ii. non metals
iii. synthetic
iv. natural.

b. Classify metals into:
i. ferrous
ii. non ferrous
iii. pure metals
iv. alloys.

Factors which affect the selection of listed materials

a. Identify the range of selection factors which determine the use of materials to include:
i. material costs
ii. suitability for use
iii. form of supply
iv. joining characteristics
v. strength
vi. material properties
vii. corrosion resistance
viii. melting point.

b. Compare the factors affecting the use of:
i. pure metals
ii. alloys
iii. plastics.

c. Understand the importance of melting points of the following:
i. LC steel
ii. aluminium alloy
iii. stainless steel
iv. solder
v. common plastics.

Listed materials used in repair or construction

a. Identify the types and properties of steels used in construction and repair to include:
i. low carbon steels
ii. medium carbon steels
iii. high carbon steels
iv. cast irons
v. alloy steels
vi. UHSS.

b. Describe the properties of common non ferrous metals used in construction and repair to include:
i. aluminium
ii. zinc
iii. lead
iv. tin
v. copper.

c. Compare and identify listed non-metals used in repair or construction to include:
    i. plastics
    ii. glass
    iii. fabrics
    iv. leather
    v. rubber.
d. Define the terms:
    i. thermo plastic
    ii. thermo setting plastics.
e. Identify the uses and properties of materials used for interior furnishings such as:
    i. rubber
    ii. fabric
    iii. leather
    iv. glass.
f. Give examples of common plastics used in repair and construction including:
    i. ABS
    ii. polyethylene
    iii. polypropylene
    iv. polyester
    v. acrylic
    vi. glass reinforced plastic.
g. State the constituents and general properties of the following alloys:
    i. solder
    ii. stainless steel
    iii. low carbon steel
    iv. brass
    v. aluminium alloys including duralumin.

Ways in which the properties of metals can be changed temporarily or permanently

a. Explain the advantages of changing the material properties temporarily.
b. Explain the effects of changing the material properties permanently
c. State the advantages of changing materials properties.
d. State that material properties can be changed by:
    i. heat treatment
    ii. cold working
    iii. alloying.
e. Describe how the properties of metals are changed under the above three headings

Causes of corrosion in steel car bodies

a. Explain the principle of oxidation to include:
    i. simple corrosion cell
    ii. combination with oxygen
    iii. effects of an electrolyte
    iv. effects of dissimilar metals.

b. Identify reasons for corrosion in vehicles to include:
    i. bad joint design
    ii. poor protection
    iii. stone chips
    iv. water leaks
    v. industrial pollution.
c. Explain that methods of corrosion protection can include:
    i. protective metal coatings
    ii. protective non-metal coatings
    iii. cavity waxes
    iv. anti chip coatings
    v. sealers.
d. Describe the effects of corrosion in a vehicle body to include:
    i. loss of strength
    ii. manufacturer's warranty consideration
    iii. loss of appearance.

Characteristics of body assemblies

a. Describe methods of producing body panels to include:
    i. forming
    ii. pressing
    iii. moulding.
b. Describe the methods of imparting strength to sheet metal to include:
    i. swages
    ii. edging
    iii. forming into sections
    iv. combining sections into box sections
    v. the principles of crowned panels.
c. Describe the characteristics of monocoque structures.
d. Describe the characteristics of separate construction.
e. Identify by name and description of use, the following:
    i. sill panel
    ii. bulkhead
    iii. chassis leg
    iv. inner flitch
    v. cross member
    vi. a, b, c and d posts
    vii. roof
    viii. cant rail
    ix. windscreen header rails
    x. floor assembly
    xi. inner wheel arches
    xii. dog leg
    xiii. scuttle panels
    xiv. front panel
    xv. headlamp mounting panels
    xvi. back panel.

Appendix 1 Relationships to other qualifications

Links to other qualifications

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

This qualification has connections to the 4311 SVQ 3 in Vehicle Body Repair and Alignment at SCQF Level 6.

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- SQA Accreditation's Regulatory Principles, version 2, 1 December 2014
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Events**: dates and information on the latest Centre events
- **Online assessment**: information on how to register for GOLA assessments.

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www.cityandguilds.com

Useful contacts

UK learners General qualification information	T: +44 (0)844 543 0033 E: **learnersupport@cityandguilds.com**
International learners General qualification information	T: +44 (0)844 543 0033 F: +44 (0)20 7294 2413 E: **intcg@cityandguilds.com**
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **centresupport@cityandguilds.com**
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 F: +44 (0)20 7294 2404 (BB forms) E: **singlesubjects@cityandguilds.com**
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **intops@cityandguilds.com**
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **walledgarden@cityandguilds.com**
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: **business@cityandguilds.com**
Publications Logbooks, Centre documents, Forms, Free literature	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413

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