QUALIFICATION HANDBOOK

Diploma in Accident Repair Body Principles at SCQF Level 5 (4391-12)

February 2018 Version 1.3

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
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 Principles at SCQF Level 5	4391-12	R168 04

Version and date	**Change detail**	**Section**
1.1 Feb 2013	Amendment to range Unit 054	**Units**
1.2 Oct 2013	Unit supporting information updated with introductory text	**Units**
1.3 Feb 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?	This is ideal for young or adult learners with little or no knowledge and experience of the automotive industry. They are a route into the automotive industry and will enable you to work on routine accident repair tasks under minimal supervision. Successful candidates will have the basic skills needed to apply for an automotive apprenticeship or similar engineering pathway.
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 Modem 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: • 4311-12/13 SVQ 2 and 3 in Vehicle Body Repair at SCQF Level 5/6 • 4391-13 Diploma in Accident Repair Body Principles at SCQF Level 6.

Structure

Qualification	Credits		
	Total	**Mandatory**	**Optional**
Diploma in Accident Repair Body Principles at SCQF Level (4391-12)	**81**	**77 credits**	**4 (minimum)**
		001, 003, 004, 051, 053, 054, 102, 105, 106, 119, 120, 152, 155, 156, 169, 170, 176	101 and 151 or 121 and 171 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
004	Skills in materials, fabrication, tools and measuring devices used in the automotive environment	7
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
054	Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	4
102	Skills in removing and fitting non permanently fixed motor vehicle body panels	2
105	Skills in removing and replacing exterior motor vehicle body panels including permanently fixed components	5
106	Skills in carrying out minor repairs to motor vehicle exterior body panels	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
152	Knowledge of removing and fitting non permanently fixed motor vehicle body panels	2
155	Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components	6
156	Knowledge of minor motor vehicle exterior body panel repairs	6
169	Knowledge of motor vehicle body metal active gas (MAG) welding techniques	5

City & Guilds unit	Unit title	Credit value
170	Knowledge of motor vehicle body resistance spot welding operations	5
176	Knowledge of motor vehicle construction and materials	2
Optional		
101	Skills in removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	2
121	Skills in motor vehicle body metal inert gas (MIG) brazing operations	5
124	Skills in motor vehicle body mechanical fastening operations	2
125	Skills in motor vehicle body adhesive bonding 0perations	2
151	Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	2
171	Knowledge of motor vehicle body metal inert gas (MIG) brazing 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 2 Certificate/Diploma in Maintenance and Repair - Body (4101-59) will be automatically approved to register and certificate candidates on the 4391-12 (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 these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the area(s) 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 this qualification. However, centres must ensure that candidates have the potential and opportunity to gain the qualification 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 is 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, 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

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. I

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.

Level 2 Diploma in Accident Repair Body Principles

City & Guilds unit	SCQF 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
004	Level 5	Skills in materials, fabrication, tools and measuring devices used in the automotive environment	7	Assignment

City & Guilds unit	SCQF Level	Unit title	Credit value	Assessment method
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
054	Level 5	Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	4	Assignment
101	Level 5	Skills in removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	2	Assignment
102	Level 5	Skills in removing and fitting non permanently fixed motor vehicle body panels	2	Assignment
105	Level 5	Skills in removing and replacing exterior motor vehicle body panels including permanently fixed components	5	Assignment
106	Level 5	Skills in carrying out minor repairs to motor vehicle exterior body panels	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
124	Level 5	Skills in motor vehicle body mechanical fastening operations	2	Assignment
125	Level 6	Skills in a motor vehicle body adhesive bonding operations	2	Assignment
151	Level 5	Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	2	Multiple choice test
152	Level 5	Knowledge of removing and fitting non permanently fixed motor vehicle body panels	2	Multiple choice test
155	Level 5	Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components	6	Multiple choice test

City & Guilds unit	SCQF Level	Unit title	Credit value	Assessment method
156	Level 5	Knowledge of minor motor vehicle exterior body panel repairs	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
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
- 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 004 Skills in materials, fabrication, tools and measuring devices used in the automotive environment

Level:	**5**
Credit value:	7
Relationship to NOS:	This unit is linked to NOS G4 - Use of Hand Tools and Equipment in Motor Vehicle Engineering.
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 for: • the correct selection, care and use of key hand tools and measuring devices for modification, fabrication and repair in the automotive environment • the correct preparation and use of common work environment equipment • the correct selection and fabrication of materials used when modifying and repairing • the correct application of automotive engineering fabrication and fitting principles.

Learning outcome	**The learner will:**
1. be able to select, maintain and use hand tools and measuring devices in the automotive environment	
Assessment criteria	
The learner can: 1.1 select, maintain and use suitable hand tools safely when fabricating and fitting in the automotive workplace 1.2 select, maintain and use suitable measuring devices safely when fabricating and fitting in the automotive environment 1.3 select, maintain and use suitable PPE for fabrication, repair and fitting in the automotive environment. 1.4 select, maintain and use suitable electrical measuring tools safely when repairing vehicles and components.	

Learning outcome	The learner will:
2. be able to prepare and use common workshop equipment	
Assessment criteria	
The learner can: 2.1 use suitably maintained workshop equipment safely 2.2 use correct interpretation of 'safe working load' on lifting and supporting equipment 2.3 report any faulty or damaged tools and equipment to the relevant persons clearly and promptly 2.4 store work tools and equipment in a safe manner which permits ease of access and identification for use.	

Learning outcome	The learner will:
3. be able to select materials when fabricating, modifying and repairing vehicles and fitting components	
Assessment criteria	
The learner can: 3.1 select and use appropriate materials whilst constructing, fitting, modifying or repairing vehicles and components.	

Learning outcome	The learner will:
4. be able to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components	
Assessment criteria	
The learner can: 4.1 use correct procedures when: a. filing b. tapping threads c. cutting plastics and metals d. drilling plastics and metals e. fitting 4.2 use appropriate techniques when fabricating, repairing and modifying vehicles and components 4.3 select and use: a. gaskets b. seals c. sealants d. fittings and fasteners 4.4 apply modification and repair techniques to automotive electrical circuits 4.5 select and use locking, fixing and fastening devices.	

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 minimise 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 eg 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 manufacturers' 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 manufacturers' 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 054 Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment

Level:	**5**
Credit value:	4
Relationship to NOS:	This unit is linked to NOS G4 - Use of Hand Tools and Equipment in Motor Vehicle Engineering.
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: • the correct selection, care and use of key hand tools and measuring devices for modification, fabrication and repair in the automotive environment • the correct preparation and use of common automotive environment equipment • the correct selection and fabrication of materials used when modifying and repairing • the correct application of automotive engineering fabrication and fitting principles.

Learning outcome	**The learner will:**
1. understand how to select, use and care for hand tools and measuring devices in the automotive environment	
Assessment criteria	
The learner can: 1.1 identify and explain the use of common types of hand tools used for fabricating and fitting in the automotive environment 1.2 identify and explain the use of common measuring devices used for fabrication and fitting in the automotive environment 1.3 describe, within the scope of their responsibilities, how to select, prepare and maintain hand tools, measuring devices and PPE used for fabrication, repair and fitting in the automotive environment 1.4 state the limitations of common hand tools and measuring devices used for fabricating, repair and fitting in the automotive workplace 1.5 explain how common hand tools and measuring devices used for fabricating, repair and fitting in the automotive environment should be stored and maintained	

1.6	identify common electrical measuring tools used in the repair of vehicles and components
1.7	explain the preparation and safe and correct use of common electrical tools when measuring voltage, current and resistance.

Learning outcome	**The learner will:**
2. understand how to prepare and use common workshop equipment	
Assessment criteria	
The learner can:	
2.1	describe the preparation and safe use of workshop equipment
2.2	explain the term: safe working load.

Learning outcome	**The learner will:**
3. understand how to select materials when fabricating, modifying and repairing vehicles and fitting components	
Assessment criteria	
The learner can:	
3.1	describe the properties, application and limitations of ferrous and non-ferrous metals, including their safe use
3.2	describe the properties, application and limitations of common non-metallic materials, including their safe use
3.3	define common terms relating to the properties of materials.

Learning outcome	**The learner will:**
4. understand how to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components	
Assessment criteria	
The learner can:	
4.1	describe how to tap threads, file, cut and drill plastics and metals when modifying or repairing vehicles
4.2	describe how to measure, mark out, shape and join materials when fabricating
4.3	describe the selection and fitting procedures of the following: a. gaskets and seals b. sealants and adhesives c. fittings and fasteners d. electrical circuit components
4.4	identify locking, fastening and fixing devices
4.5	state the importance of correct operating specifications for limits, fits and tolerances in the automotive environment.

Unit 054 Knowledge of materials, fabrication, tools and measuring devices used 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.

Common types of hand tools used for fabricating and fitting in the automotive workplace to include:

a. Files.
b. Hacksaws and snips.
c. Hammers.
d. Screwdrivers.
e. Pliers.
f. Spanners.
g. Sockets.
h. Punches.
i. Types of drill and drill bits.
j. Taps and dies.
k. Stud removers.
l. Marking out tools.

Common measuring devices used for fabrication and fitting in the automotive workplace. To include:

a. Rule or tape.
b. Callipers.
c. Feeler gauge.
d. Volume measures.
e. Micrometer.
f. Dial gauges.
g. Torque wrenches.
h. Depth gauges.

Common electrical measuring tools used in the repair of vehicles and components. To include:

a. Ammeter.
b. Voltmeter.
c. Ohmmeter.
d. Multi-meter.

Common electrical terms when measuring::

a. Voltage.
b. Current.
c. Resistance.

Workshop equipment (including appropriate PPE). To include:

a. Hydraulic jack.
b. Axle stands.
c. Pillar drills.
d. Air tools.
e. Vehicle lifts.
f. Cranes.
g. Hoists.
h. Electrical power tools.

The properties, application and limitations (to include safe use) of ferrous and non-ferrous metals used when constructing, modifying and repairing vehicles and components. Materials to include:

a. Carbon steels.
b. Alloy steels.
c. Cast iron.
d. Aluminium alloys.
e. Brass.
f. Copper.
g. Lead.

Properties, application and limitations (to include safe use) of non-metallic materials used when constructing, modifying and repairing vehicles and components.

Materials to include:

a. glass
b. plastics (inc. GRP)
c. Kevlar
d. rubber.

Terms relating to the properties of materials to include:

a. hardness
b. toughness
c. ductility
d. elasticity
e. tenacity
f. malleability
g. plasticity.

Unit 101 Skills in removing and fitting motor mechanical, electrical and trim (MET) components to vehicles

Level:	**5**
Credit value:	2
Relationship to NOS:	This unit is linked to NOS BP01 - Remove and Fit Basic Motor Mechanical, Electrical and Trim (MET) Components to Vehicles.
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 in order to remove and fit a range of mechanical, electrical and trim (MET) components to vehicles. 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 fitting of MET components to vehicles	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and use suitable vehicle coverings throughout all MET 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 recognised 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 recognised 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 MET components 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 removal and fitting of MET components.	

Learning outcome	The learner will:
4. be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 4.1 carry out removal and fitting of MET components adhering to the correct specifications and tolerances for the vehicle and 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 4.2 ensure that the removal and fitting of MET components conforms to the vehicle operating specification and any legal requirements 4.3 ensure no damage occurs to other components when removal and fitting of MET components 4.4 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 102 Skills in removing and fitting non permanently fixed motor vehicle body panels

Level:	**5**
Credit value:	2
Relationship to NOS:	This unit is linked to NOS BP02 Remove and Fit Non Permanently Fixed 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 fitting of non-permanently fixed vehicle 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 recognised 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 recognised 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 non-permanently fixed vehicle 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 removal and fitting of non-permanently fixed vehicle panels.	

Learning outcome	The learner will:
4. be able to carry out removal and fitting of non-permanently fixed vehicle panels	
Assessment criteria	
The learner can: 4.1 carry out removal and fitting of non-permanently fixed vehicle panels 4.2 carry out removal and fitting of non-permanently fixed vehicle panels adhering to the correct specifications and tolerances for the vehicle 4.3 ensure that the removal and fitting of non-permanently fixed panels conforms to the vehicle operating specification and any legal requirements 4.4 ensure the components are realigned correctly in a way which regains their original manufactured tolerance 4.5 ensure no damage occurs to other components when removal and fitting of non-permanently fixed vehicle panels 4.6 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 105 Skills in removing and replacing exterior motor vehicle body panels including permanently fixed components

Level:	**5**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP05 – Remove and Replace Exterior Motor Vehicle Body Panels Including Permanently Fixed Components.
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 a range of removal and fitting of exterior panels using mechanical fastening, adhesive bonding, welding and joining techniques. 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 exterior vehicle panels including permanently fixed 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 exterior body panels including permanently fixed vehicle panels 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 removal and fitting of exterior body panels including permanently fixed vehicle panels.	

Learning outcome	The learner will:
4. be able to carry out removal and fitting of exterior vehicle panels including permanently fixed 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 remove and re-fit adjacent exterior body panels including those that are permanently fixed 4.3 carry out removal and fitting of exterior body panels including permanently fixed vehicle panels adhering to specifications and tolerances for the vehicle and following: a. recognised researched removal and fitting methods b. health and safety requirements c. workplace procedures 4.4 use and apply sealants and anti corrosion materials conforming to the manufacturers specification 4.5 ensure that the replacement panels conform to the vehicle specifications for dimension, material and functional capability 4.6 ensure the components are realigned correctly in a way which regains their original manufactured tolerance 4.7 ensure any damage is minimised to mating surfaces. Any damage caused should be correctly reinstated 4.8 ensure permanently fixed panels are replaced without incurring damage to the vehicle systems 4.9 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 106 Skills in carrying out minor repairs to motor vehicle exterior body panels

Level:	**5**
Credit value:	5
Relationship to NOS:	This unit is linked to NOS BP06 – Repair Motor Vehicle Exterior 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 minor repairs to motor vehicle exterior 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 minor repairs to motor vehicle exterior 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. manufacturers' instructions b. vehicle technical data c. removal and fitting procedures d. 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 repairs to motor vehicle exterior and body panels 3.2 check 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 repairs to motor vehicle exterior body panels.	

Learning outcome	The learner will:
4. be able to carry out minor repairs to motor vehicle exterior 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 carry out minor repairs to motor vehicle exterior body panels so they are restored to their original contour using hand tools and filling materials effectively 4.3 carry out minor repairs to motor vehicle exterior body panels adhering to specifications and tolerances for the vehicle and 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 replace any sealer, anti corrosion and sound deadening materials which were removed prior to the repair and conforming to the manufacturer's specification 4.5 ensure all plastic repairs regain the strength of the original part 4.6 ensure any damage is minimised to mating surfaces. Any damage caused should be correctly reinstated 4.7 ensure all completed repairs are finished to an 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 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 124 Skills in 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 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:	**6**
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 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 151 Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles

Level:	**5**
Credit value:	2
Relationship to NOS:	This unit is linked to NOS BP01 - Remove and Fit Basic Motor Mechanical, Electrical and Trim (MET) Components to Vehicles.
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 a range of removal and fitting of mechanical, electrical and trim (MET) components to vehicles. It also covers the evaluation of the operation of the components when fitted.

Learning outcome	**The learner will:**
1. understand how to carry out removal and fitting of motor vehicle mechanical electrical and trim (MET) components	
Assessment criteria	
The learner can:	
1.1	identify the procedures involved in carry out the systematic removal and fitting of vehicle MET components to the standard required
1.2	identify the procedures involved in working with supplementary safety systems when fitting vehicle MET components
1.3	identify the procedures involved in working with gas discharge headlamp systems when fitting vehicle MET components
1.4	describe the methods and procedures for storing removed vehicle MET components
1.5	identify the different types of fastenings and fixings used when removing and fitting vehicle MET components
1.6	explain the reasons for the use of different types of fastenings and fixings used in vehicle MET components
1.7	describe the procedures, methods and reasons for ensuring correct alignment of vehicle MET components
1.8	identify the quality checks that can be used to ensure correct alignment and operation of vehicle MET components

1.9	identify correct conformity of vehicle systems against vehicle specification and legal requirements on completion
1.10	explain the procedure for reporting cosmetic damage to vehicle MET components and units.

Unit 151 Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles

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.

Procedures to prevent damage to the vehicle, components and contents when removing, storing and refitting MET components

a. The methods that can be used to protect undamaged items to ensure they are removed and refitted without causing unnecessary damage:
    i. bumpers
    ii. headlamp units
    iii. road wheels
    iv. batteries
    v. bonnet fittings
    vi. interior trim components
    vii. exterior trim components.
b. The procedures for the correct storage of vehicle contents.
c. The process for the reporting of extra damage and items that may have broken when removed or refitted.

The processes involved when handling batteries

a. The procedure for the removal, storage and refitting of lead acid batteries.
b. The procedure for the disposal of lead acid batteries.
c. Battery checks:
    i. electrolyte
    ii. discharge
    iii. specific gravity.
d. The charging process and procedures:
    i. trickle charge
    ii. normal charge
    iii. boost / start.
e. The health and safety issues involved when charging (explosive gasses).

Types of clips and fixings

a. The following types of clips and identify reasons and limitations for their use:
    i. speed
    ii. 'c'
    iii. 'd'
    iv. 'j' type captive nut
    v. 'r'
    vi. 'u' type captive nut
    vii. cable clip
    viii. trim clips.

b. The following types of fixings and identify reasons and limitations for their use:
    i. rivets
    ii. plastic capture nut
    iii. nut and bolt
    iv. shoulder bolt
    v. 'Nyloc' type nuts
    vi. washers
    vii. 'Spring' type washers
    viii. self tapping screws and bolts
    ix. quick release plastic trim fastenings
    x. trim tapes
    xi. adhesives and sealers.

The processes involved when carrying out quality checks

a. Items that may have been 'workshop' soiled and describe processes for rectifying:
    i. door cards
    ii. seats
    iii. carpets
    iv. boot and bonnet trims.

b. Methods for checking gaps.

c. The process for checking and aligning headlamps:
    i. address handling procedures for halogen bulbs
    ii. address handling and health and safety issues relating to xenon bulbs and systems.

d. Operational checks and rectification methods to include:
    i. lights
    ii. washers and wipers
    iii. SRS systems (checking not rectification)
    iv. charging system (checking not rectification)
    v. horn
    vi. fluid levels
    vii. interior switches
    viii. operation of door lock mechanisms.

Unit 152 Knowledge of removing and fitting non permanently fixed motor vehicle body panels

Level:	**5**
Credit value:	2
Relationship to NOS:	This unit is linked to NOS BP02 Remove and Fit Non Permanently Fixed 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 knowledge in order to carry out removal and fitting 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. understand how to carry out removal and fitting of non-permanently fixed motor vehicle body panels	
Assessment criteria	
The learner can: 1.1 identify the procedures involved in carrying out the systematic removal and fitting of non-permanently fixed vehicle body panels: a. wings b. doors c. bonnets d. boot lids e. tailgates 1.2 identify the procedures involved in working with supplementary safety systems when fitting basic non-permanently fixed vehicle body panels 1.3 describe the methods and procedures for storing removed non-permanently fixed vehicle body panels 1.4 identify the different types of fastenings and fixings used when removing and fitting non-permanently fixed vehicle body panels 1.5 explain the reasons for the use of different types of fastenings and fixings used in non-permanently fixed vehicle body panels 1.6 describe the procedures, methods and reasons for ensuring alignment of non-permanently fixed vehicle body panels 1.7 identify the quality checks that can be used to ensure alignment and operation of non-permanently fixed vehicle body panels	

1.8	identify conformity of vehicle systems against vehicle specification and legal requirements on completion
1.9	explain the procedure for reporting damage to vehicle non-permanently fixed vehicle body panels.

Unit 152 Knowledge of removing and fitting non permanently fixed 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.

Removing and fitting non permanently fixed body panels

a. Find, interpret and use sources of information applicable to the removal and fitting of basic non welded body panels.
b. Select, check and use all the tools and equipment required to remove and fit basic non welded body panels. The different types of mechanical fixings for non welded panels and when and why they should be used.
c. The correct procedures and processes for removing and fitting of non welded body panels.
d. The need for correct alignment of panels and methods to achieve this.
e. Aperture gaps.
f. Alignment of panel features.
g. Best fit of components to panels.
h. Operation of openings such as doors, tailgates, bonnets etc.
i. The types of quality control checks that can be used to ensure correct alignment and contour of panels and operation of components to manufacturer's specification.
j. The method of storing removed panels and the importance of storing them correctly.

Unit 155 Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components

Level:	**5**
Credit value:	6
Relationship to NOS:	This unit is linked to NOS BP05 – Remove and Replace Exterior Motor Vehicle Body Panels Including Permanently Fixed Components.
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 removal and refitting of exterior panels using mechanical fastening, adhesive bonding, welding and joining techniques.

Learning outcome	**The learner will:**
1. understand material types and properties used in removing and replacing exterior vehicle 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 describe the properties of 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 describe the correct type of sealant to use in a given application in removing and replacing vehicle panels 1.5 describe how to apply sealants and anti corrosion materials following manufacturer's recommended methods.	

Learning outcome	The learner will:
2. understand how to carry out removal and replacing of fixed and non-permanently fixed exterior vehicle body panels including fixed panels	
Assessment criteria	
The learner can: 2.1 identify the procedures involved in carry out the systematic removal of the manufacturer's original joining technique 2.2 identify the procedures involved in carry out the systematic replacement of fixed and non-permanently fixed vehicle panels using recognised joining techniques 2.3 identify the procedures involved in working with supplementary safety systems when replacing fixed and non-permanently fixed exterior vehicle body panels including fixed panels 2.4 describe the need for correct alignment of panels and the methods used to achieve this 2.5 identify the quality checks that can be used to ensure correct alignment and contour of panels and operation of components to manufacturer's specification 2.6 describe the methods and procedures for storing components and the importance of storing them correctly and in accordance with legal requirements 2.7 identify the different types of fastenings, fixings and adhesives bonding used in the removal and replacement of vehicle body panels 2.8 explain the reasons for the use of different types of fastenings, fixings and adhesives used in vehicle body panel replacement 2.9 identify the procedures involved in carry out the systematic replacement of vehicle panels using fastenings, fixings and adhesives bonding techniques 2.10 describe how panel removal and replacement affects the overall body structure 2.11 identify the manufacturers approved methods of working for he removal and replacement of exterior body panels 2.12 identify correct conformity of vehicle systems against vehicle specification and legal requirements on completion 2.13 explain the procedure for reporting damage caused to the vehicle during the panel replacement activities.	

Unit 155 Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components

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 materials

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

Removing and fitting of non welded body panels

a. How to find, interpret and use sources of information applicable to the removal and fitting of non welded body panels.
b. How to select, check and use all the tools and equipment required to remove and fit non welded structural body panels, the different types of mechanical fixings for non welded body panels and when and why they should be used.
c. The correct procedures and processes for removing and fitting of non welded body panels.
d. The need for correct alignment of panels and methods to achieve this:
e. Aperture gaps.
f. Alignment of panel features.
g. Best fit of components to panels.
h. Operation of openings such as doors, tailgates, bonnets etc.
i. The types of quality control checks that can be used to ensure correct alignment and contour of panels and operation of components to manufacturer's specification.
j. The method of storing removed panels and the importance of storing them correctly.

Removal and replacement of welded body panels

a. Principles of welding.
b. How to spot and MIG weld vehicle panels.
c. How to remove spot and MIG welded vehicle panels.
d. How to interpret and use sources of information relevant to the removal and refitting of non-stressed body panels.
e. The need for correct alignment of panels and the methods used to achieve this.
f. The types of quality control checks that can be used to ensure correct alignment and contour of panels and operation of components to manufacturer's specification.
g. How to work safely avoiding damage to the vehicle and its systems.
h. The methods of storing removed panels and the importance of storing them correctly.
i. The removal and replacement procedures for body panels using mechanical fastening, adhesive bonding and welding techniques.
j. How panel removal and refitting affects the overall body structure of the vehicle. The manufacturer's approved methods of working for the removal and replacement of body panels including:
    i. resistance spot
    ii. MIG MAG
    iii. MIG braze
    iv. adhesive bonding
    v. laser
    vi. laser stitch
    vii. mechanical fastening.

Unit 156 Knowledge of minor motor vehicle exterior body panel repairs

Level:	**5**
Credit value:	6
Relationship to NOS:	This unit is linked to NOS BP06 – Repair Motor Vehicle Exterior 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 exterior 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 minor repairs on motor vehicle exterior 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 to carry out reshaping work including specialist dent removal tools 1.3 describe how to prepare, test, use and maintain the hand and power tools required to prepare damage and reshape damaged areas.	

Learning outcome	**The learner will:**
2. understand material types and properties used in minor repairs on motor vehicle exterior body panels	
Assessment criteria	
The learner can: 2.1 identify the properties and different types of materials used in the construction of vehicle bodies 2.2 describe the properties and use of metals used to manufacturer body panels 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 describe the techniques for identifying the type of plastic used for manufactured components 2.6 identify and describe the different types and grades of abrasive paper and their use.	

Learning outcome	The learner will:
3. understand how to carry out minor repairs to motor vehicle exterior body panels	
Assessment criteria	
The learner can: 3.1 describe how to prepare the vehicle to avoid contamination 3.2 describe how to prepare damaged areas to facilitate repairs 3.3 describe how to rough out and metal finish body panels 3.4 identify the procedures involved to reshape filling materials to match the original contour 3.5 describe how to finish repairs to a suitable agreed condition to enable the next stage of repairs to proceed 3.6 identify the procedures for repairing damage to plastic components including thermal and adhesive techniques 3.7 describe the techniques used to regain the contours of repaired plastic components 3.8 identify and describe the techniques for reshaping damaged body panels using hand and specialist tools 3.9 describe the methods used to check for panel contours for accuracy after reshaping 3.10 explain the procedures for reinstating anti-corrosion, sealant and sound deadening materials 3.11 describe the aspects of pedestrian safety in relation to the reparability of vehicles.	

Unit 156 Knowledge of minor motor vehicle exterior body panel 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

a. The principles governing the selection and use of hand tools for metal finishing and plastic filler repairs. Include:
    i. panel beating hammers
    ii. dolly blocks
    iii. beating files
    iv. body spoons
    v. dual action sanders.
b. How to select the correct tools to carry out reshaping work, including specialist dent removal tools including:
    i. panel pullers.
c. How to prepare, test and use and maintain the hand and power tools required to prepare damage and reshape damaged areas.

Selection and use of materials

a. How to mix and apply plastic fillers.
b. The properties and use of metals used to manufacture body panels.
c. The properties and safe use of types of filling materials used to repair panels including:
    i. plastic fillers.
d. The different types and grades of abrasive and their use.
e. The techniques to identify the type of plastics used for manufactured components.

Repairing body panels

a. How to interpret and use sources of information relevant to the removal of body components.
b. How to prepare damaged areas to facilitate repairs.
c. How to repair plastic components using thermal and adhesive techniques.
d. How to rough out and metal finish body panels.
e. How to reshape filling materials to match the original panel contour.
f. How to finish repairs to a suitable condition for handing on to the painting stage.
g. How to work safely avoiding damage to the vehicle and its systems.
h. The techniques for reshaping damaged body panels using hand and specialist tools.

i. The procedures for reinstating anti-corrosion, sealant and sound deadening materials.
j. The procedures for repairing damage to plastic components.
k. The techniques and processes for:
    i. plastic repairs
    ii. hot shrinking
    iii. panel pulling
    iv. metal finishing
    v. plastic filing
    vi. indirect hammering
    vii. direct hammering.
l. The techniques used to regain the contours of repaired plastic components.
m. Methods of checking reshaped panel contours for accuracy.
n. Standards of finish require to enable the next stage of repairs to proceed.
o. The manufacturer's approved methods of working for the preparation and repair of body panels.

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 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 for VRQs.
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. anaerobic
    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 chassis designs used for modern vehicles, including commercials 2.3 explain the effects 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 2 and 3 in Vehicle Body Repair at SCQF Level 5/6.

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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