



INSTITUTE
OF THE MOTOR
INDUSTRY

IMI QUALIFICATION



VCQ Assessment Record for

IMI Level 2 Diploma in Motorcycle Maintenance and Repair Competence

I.D: 500/9817/2

To be read with Learner Guidance and Written Assessments (optional).

For assessors only: Assessor and Verifier Guidance

CENTRE INFORMATION

Please be aware that any **legislation** referred to in this qualification may be subject to amendment/s during the life of this qualification. Therefore IMI Approved Centres must ensure they are aware of and comply with any amendments, e.g. to health and safety legislation and employment practices.

Please be aware that **vehicle technologies** referred to in this qualification reflect current practice, but may be subject to amendment/s, updates and replacements during the life of this qualification. Therefore IMI Approved Centres must ensure they are aware of the latest developments and emerging technologies to ensure the currency of this qualification.

Please note: the relevance of the information contained in the **unit content** will vary depending upon the vehicle types being worked upon. The unit content is for guidance only and is not meant to be prescriptive.

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Requests should be made in writing and addressed to:
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Fanshaws, Brickendon, Hertford SG13 8PQ



CONTACT SHEET

Learner Name:	
Learner Registration No:	
Learner Address:	
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Employer Contact:	
Employer Name & Address:	
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Please complete as appropriate:	
Witness Name:	Witness Name:
Witness Job Title:	Witness Job Title:
Witness Signature:	Witness Signature:
Witness Name:	Witness Name:
Witness Job Title:	Witness Job Title:
Witness Signature:	Witness Signature:
Assessor Name:	Assessor Name:
Assessor Signature:	Assessor Signature:
Assessor Name:	
Assessor Signature:	
Internal Verifier Name:	Internal Verifier Name:
Internal Verifier Signature:	Internal Verifier Signature:

**IMI Level 2 Diploma in Motorcycle Maintenance and Repair Competence (VCQ)**

This qualification consists of 6 Mandatory Units, 9 Mandatory Specialist Units and 4 Optional Units.

All units are either Competency (C), Skills (S) or Knowledge (K) Units. The C, K or S units are combined to form a topic 'set'

In order to pass the qualification, learners must achieve a minimum of 95 credits from the following groups:

Group A: 29 credits from the 6 Mandatory Units.

Group B: 57 credits from the Mandatory Specialist Units

Group C: A minimum of 9 credits from 1 'set'

A minimum of 95 credits must be achieved at Level 2 or above.

Please note that every knowledge unit has an online test and the test number is the same as the 'set ref'

Group A: Mandatory Units

Set Ref:	Unit Ref, Unit Title & I.D. Number	GLH	Unit Level	Credit Value
G0102	G0102C – Competency in Health, Safety and Good Housekeeping in the Automotive Environment (A/601/6338)	60	2	7
	G0102K – Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment (D/601/6171)	30	2	3
G3	G3C – Competency in Supporting Job Roles in the Automotive Environment (K/601/6366)	40	3	5
	G3K – Knowledge of Support for Job Roles in the Automotive Environment (T/601/6175)	20	3	3
G4	G4K – Knowledge of Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment (K/601/6237)	40	2	4
	G4S – Skills in Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment (Y/601/6279)	60	2	7

GROUP B: Mandatory Specialist Units

Set Ref:	Unit Ref, Unit Title & I.D. Number	GLH	Unit Level	Credit Value
MC01	MC01C – Competency in Routine Motorcycle Maintenance (D/601/5442)	60	2	7
	MC01K – Knowledge of Routine Motorcycle Maintenance (F/601/5515)	20	2	2
MC02.1	MC02.1K – Knowledge of Motorcycle Internal Engine Systems (Y/601/5519)	20	2	3
MC02.2	MC02.2K – Knowledge of Motorcycle Fuel, Ignition, Air and Exhaust System Units and Components (T/601/5527)	20	2	3
MC02	MC02C – Competency in Motorcycle Internal Engine Systems (L/601/5484)	90	2	10
MC03	MC03C – Competency in Removing and Replacing Motorcycle Electrical Units and Components (K/601/5489)	90	2	10
	MC03K – Knowledge of Removing and Replacing Motorcycle Electrical Units and Components (H/601/5555)	45	2	6
MC04	MC04C – Competency in Removing and Replacing Motorcycle Chassis Units and Components (T/601/5494)	90	2	10
	MC04K – Knowledge of Removing and Replacing Motorcycle Chassis Units and Components (T/601/5558)	45	2	6

GROUP C: Optional Units

Set Ref:	Unit Ref, Unit Title & I.D. Number	GLH	Unit Level	Credit Value
G8C	G8C – Competency in Identifying and Agreeing Motor Vehicle Customer Service Needs (K/601/6383)	40	3	5
	G8K – Knowledge of How to Identify and Agree Motor Vehicle Customer Service Needs (R/601/6247)	45	3	5
MC05	MC05C – Competency in Motorcycle Preparation and Inspection (J/601/5497)	60	2	7
	MC05K – Knowledge of Motorcycle Preparation and Inspection (F/601/5563)	20	2	2



Learner Name:

UNIT REF: G0102C	UNIT TITLE: COMPETENCY IN HEALTH, SAFETY AND GOOD HOUSEKEEPING IN THE AUTOMOTIVE ENVIRONMENT
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Level: 2	Route: Competence	Credit Value: 7	GLH: 60
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Mapping: This unit is mapped to the IMI NOS G1 and G2

Rationale: This unit will enable the learner to develop competency in order 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 and work safely at all times within the automotive environment, both as an individual and with others.

LEARNING OUTCOMES	ASSESSMENT CRITERIA	Ref No	Date
The Learner will:	The Learner can:		
1. Be able to use correct personal and vehicle protection within the automotive environment	1.1. Select and use personal protective equipment throughout activities. To include appropriate protection of: <ul style="list-style-type: none"> 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.		
2. Be able to carry out effective housekeeping practices in the automotive environment	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 manufacturers instructions 2.4. Perform housekeeping activities safely and in a way which minimizes 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.		



Learner Name:

3. Be able to recognise and deal with dangers in order to work safely within the automotive workplace	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		
4. Be able to conduct themselves responsibly	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		

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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EVIDENCE REQUIREMENTS

1. You must produce evidence of use of personal and vehicle protection, cleaning the work environment and disposal of waste on 3 separate occasions .	Evidence Ref:	
2. You must be observed by your assessor on at least 1 occasion carrying out the above.	Observation Ref:	
3. You must produce evidence of identifying risks which may result from at least 2 of the items listed below:	Evidence Ref:	
the use and maintenance of machinery or equipment		
the use of materials or substances		
working practices which do not conform to laid down policies		
unsafe behaviour		
accidental breakages and spillages		
environmental factors		
4. You must be observed by your assessor on at least 1 occasion carrying out the above.	Observation Ref	
5. You must produce evidence of following at least 4 of the workplace policies listed below:	Evidence Ref	
the use of safe working methods and equipment		
the safe use of hazardous substances		
smoking, eating, drinking and drugs		
what to do in the event of an emergency		
personal presentation		
6. You must be observed by your assessor following workplace policies on at least 1 occasion	Observation Ref	

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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UNIT REF: G0102K	UNIT TITLE: KNOWLEDGE OF HEALTH, SAFETY AND GOOD HOUSEKEEPING IN THE AUTOMOTIVE ENVIRONMENT
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Level: 2	Route: Knowledge	Credit Value: 3	GLH: 30
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Mapping: This unit is mapped to the IMI NOS G1 and G2

Rationale: This unit enables the learner to develop an understanding of routine maintenance and cleaning of the automotive environment and using resources economically and 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 OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand the correct personal and vehicle protective equipment to be used within the automotive environment	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
2. Understand effective housekeeping practices in the automotive environment	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



<p>3. Understand key health and safety requirements relevant to the automotive environment</p>	<p>3.1. List the main legislation relating to automotive environment health and safety.</p> <p>3.2. Describe the general legal duties of employers and employees required by current health and safety legislation</p> <p>3.3. Describe key, current health and safety requirements relating to the automotive environment.</p> <p>3.4. Describe why workplace policies and procedures relating to health and safety are important</p>
<p>4. Understand about hazards and potential risks relevant to the automotive environment</p>	<p>4.1. Identify key hazards and risks in an automotive environment</p> <p>4.2. Describe policies and procedures for reporting hazards, risks, health and safety matters in the automotive environment.</p> <p>4.3. State precautions and procedures which need to be taken when working with vehicles, associated materials, tools and equipment.</p> <p>4.4. Identify fire extinguishers in common use and which types of fire they should be used on</p> <p>4.5. Identify key warning signs and their characteristics that are found in the vehicle repair environment.</p> <p>4.6. State the meaning of common product warning labels used in an automotive environment.</p>
<p>5. Understand personal responsibilities</p>	<p>5.1. Explain the importance of personal conduct in maintaining the health and safety of the individual and others</p> <p>5.2. Explain the importance of personal presentation in maintaining health safety and welfare</p>

Content:
Economic use of resources

- a Consumable materials e.g. grease, oils, split pins, locking and fastening devices etc.
- b Requirement to maintain work area effectively
- c Cleaning tools and equipment to maximise workplace efficiency.
- d Requirement to carry out the housekeeping activities safely and in a way that minimises inconvenience to customers and staff.
- e Risks involved when using solvents and detergents.
- f 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 (2005)

Routine maintenance of the workplace

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

Content: Contd
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 Health 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 e.g. hazardous substances
- i The correct selection and use of extraction equipment

Content: contd
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 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

Content: contd
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 personal, customers, contractors etc entering your work premises
 - ix. working by the roadside
 - x. vehicle recovery

The employee's responsibilities in identifying and reporting risks within their working environment.

- a. The method of reporting risks that are outside your limits of authority.
- b. 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 policies 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.

Content: contd**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



Learner Name:

UNIT REF: G3C	UNIT TITLE: COMPETENCY IN SUPPORTING JOB ROLES IN THE AUTOMOTIVE WORK ENVIRONMENT
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Level: 3	Route: Competence	Credit Value: 5	GLH: 40
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Mapping: This unit is mapped to the IMI NOS G3

Rationale: This unit will help the learner develop competency in order to keep good working relationships with all colleagues and customers in the automotive work environment by using effective communication and support.

LEARNING OUTCOMES	ASSESSMENT CRITERIA	Ref No	Date
The Learner will:	The Learner can:		
1. Be able to work effectively within the organisational structure of the automotive work environment	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		
2. Be able to obtain and use information in order to support their job role within the automotive work environment	2.1. Select and use legal and manufacturers information, in an automotive work environment.		
3. Be able to communicate with and support colleagues and customers effectively within the automotive work environment	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 3.4. Report any anticipated delays in completion to the relevant persons promptly.		
4. Be able to develop and keep good working relationships in the automotive work environment	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		



EVIDENCE REQUIREMENTS

1. You must be observed by your assessor on at least 3 occasions carrying out the above whilst performing your normal work duties.	Observation Ref:		

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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UNIT REF: G3K	UNIT TITLE: KNOWLEDGE OF SUPPORT FOR JOB ROLES IN THE AUTOMOTIVE WORK ENVIRONMENT
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Level: 3	Route: Knowledge	Credit Value: 3	GLH: 20
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Mapping: This unit is mapped to the IMI NOS G3

Rationale: 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 OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand key organisational structures, functions and roles within the automotive work environment	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 automotive workplace. To include: a trainee b skilled technician c supervisor d manager
2. Understand the importance of obtaining, interpreting and using information in order to support their job role within the automotive work environment	2.1. Explain the importance of different sources of information in an 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 the purpose of how to use identification codes
3. Understand the importance of different types of communication within the automotive work environment	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

<p>4. Understand communication requirements when carrying out vehicle repairs in the automotive work environment</p>	<p>4.1. Explain how to report using written and verbal communication.</p> <p>4.2. Explain the importance of documenting information relating to work carried out in the automotive environment</p> <p>4.3. Explain the importance of working to agreed timescales</p>
<p>5. Understand how to develop good working relationships with colleagues and customers in the automotive workplace</p>	<p>5.1. Describe how to develop positive working relationships with colleagues and customers</p> <p>5.2. Explain the importance of developing positive working relationships</p> <p>5.3. Explain the importance of accepting other peoples' views and opinions.</p> <p>5.4. Explain the importance of making and honouring realistic commitments to colleagues and customers.</p>

Content:

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
- b. Sources of information
 - i. other staff
 - ii. manuals
 - iii. parts lists
 - iv. computer software and the internet
 - v. manufacturer
 - vi. diagnostic equipment

Communication requirements when carrying out vehicle repairs

- a Locating and using correct documentation and information for:
- b Recording vehicle maintenance and repairs
- c Vehicle specifications
- d Component specifications
- e Oil and fluid specifications
- f Equipment and tools
- g Identification codes

Procedures for:

- a Referral of problems
- b Reporting delays
- c Additional work identified during repair or maintenance
- d Keeping others informed of progress



Content: contd

Methods of communication

- a Verbal
- b Signs and notices
- c Memos
- d Telephone
- e Electronic mail
- f Vehicle job card
- g Notice boards
- h SMS text messaging
- i Letters

Organisational & customer requirements:

- a Importance of time scales to customer and organisation
- b Relationship between time and costs
- c Meaning of profit

Choice of communication

- a Distance
- b Location
- c Job responsibility

Importance of maintaining positive working relationships:

- a Morale
- b Productivity
- c Company image
- d Customer relationships
- e Colleagues



UNIT REF: G4K	UNIT TITLE: KNOWLEDGE OF MATERIALS, FABRICATION, TOOLS AND MEASURING DEVICES USED IN THE AUTOMOTIVE ENVIRONMENT
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Level: 2	Route: Knowledge	Credit Value: 4	GLH: 40
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Mapping: This unit is mapped to the IMI NOS G4

Rationale: 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 and the correct application of automotive engineering fabrication and fitting principles

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand how to select, use and care for hand tools and measuring devices in the automotive environment	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
2. Understand how to prepare and use common workshop equipment	2.1. Describe the preparation and safe use of workshop equipment 2.2. Explain the term: safe working load



<p>3. Understand how to select materials when fabricating, modifying and repairing vehicles and fitting components</p>	<p>3.1. Describe the properties, application and limitations of ferrous and non-ferrous metals, including their safe use.</p> <p>3.2. Describe the properties, application and limitations of common non-metallic materials, including their safe use</p> <p>3.3. Define common terms relating to the properties of materials</p>
<p>4. Understand how to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components</p>	<p>4.1. Describe how to tap threads, file, cut and drill plastics and metals when modifying or repairing vehicles</p> <p>4.2. Describe how to measure, mark out, shape and join materials when fabricating</p> <p>4.3. Describe the selection and fitting procedures of the following:</p> <ul style="list-style-type: none">a. gaskets and sealsb. sealants and adhesivesc. fittings and fastenersd. electrical circuit components <p>4.4. Identify locking, fastening and fixing devices</p> <p>4.5. State the importance of correct operating specifications for limits, fits and tolerances in the automotive environment</p>

UNIT REF: G4S	UNIT TITLE: SKILLS IN MATERIALS, FABRICATION, TOOLS AND MEASURING DEVICES USED IN THE AUTOMOTIVE ENVIRONMENT
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Level: 2	Route: Skills	Credit Value: 7	GLH: 60
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Mapping: This unit is mapped to the IMI NOS G4

Rationale: 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 and the correct application of automotive engineering fabrication and fitting principle

LEARNING OUTCOMES	ASSESSMENT CRITERIA	Ref No	Date
The Learner will:	The Learner can:		
1. Be able to select, maintain and use hand tools and measuring devices in the automotive environment	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		
2. Be able to prepare and use common workshop equipment	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.		
3. Be able to select materials when fabricating, modifying and repairing vehicles and fitting components	3.1. Select and use appropriate materials whilst constructing, fitting, modifying or repairing vehicles and components.		
4. Be able to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components	4.1. Use correct procedures when: <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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		

**EVIDENCE REQUIREMENTS**

1. You must produce evidence of undertaking basic routine checks of hand tools, measuring devices and workshop equipment covering all of those listed below:	Evidence Ref:	
	electrical	
	mechanical	
	pneumatic	
hydraulic		
2. You must produce evidence of fabricating at least 1 item from suitable materials to known tolerances, which includes the following processes:	Evidence Ref	
	filing	
	tapping threads	
	cutting	
	drilling	
	joining	
3. You must be observed by your assessor carrying out routine checks and during stages of fabrication	Observation Ref:	

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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Learner Name:

UNIT REF: MC01C	UNIT TITLE: COMPETENCY IN ROUTINE MOTORCYCLE MAINTENANCE
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Level: 2	Route: Competence	Credit Value: 7	GLH: 60
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Mapping: This unit is mapped to the IMI NOS MC01

Rationale: This unit allows the learner to develop skills they can carry out motorcycle routine maintenance, adjustments and replacement activities as part of the periodic servicing of motorcycles.

LEARNING OUTCOMES		ASSESSMENT CRITERIA		Ref No	Date
The Learner will:		The Learner can:			
1.	Be able to work safely when carrying out motorcycle routine maintenance	1.1. Use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities	1.2. Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment		
2.	Be able to use relevant information to carry out the task	2.1. Select suitable sources of technical information to support motorcycle routine maintenance activities including: <ul style="list-style-type: none"> a. motorcycle technical data b. maintenance procedures c. legal requirements 	2.2. Use technical information to support motorcycle inspection activities		
3.	Be able to use appropriate tools and equipment	3.1. Select the appropriate tools and equipment necessary for carrying out routine maintenance	3.2. Ensure that equipment has been calibrated to meet manufacturers' and legal requirements		
		3.3. Use the correct tools and equipment in the way specified by manufacturers when carrying out routine maintenance			
4.	Be able to carry out motorcycle routine maintenance	4.1. Carry out motorcycle inspections using prescribed methods, adhering to the correct specifications and tolerances for the motorcycle and following: <ul style="list-style-type: none"> a. the manufacturer's approved inspection methods b. recognised researched inspection methods c. health and safety requirements 	4.2. Carry out adjustments, replacement of motorcycle components and replenishment of consumable materials following the manufacturer's current specification		
		4.3. Ensure the examination methods identify accurately any motorcycle system and or component problems falling outside the maintenance schedule are specified.			
		4.4. Ensure that the inspected motorcycle conforms to the motorcycle operating specification and any legal requirements			
		4.5. Use suitable testing methods to evaluate the performance of all replaced and adjusted components and systems accurately			
		4.6. Work to the specified timescale for the activity			



<p>5. Be able to record information and make suitable recommendations</p>	<p>5.1. Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required</p> <p>5.2. Make suitable and justifiable recommendations for cost effective repairs</p> <p>5.3. Identify and report any expected delays in completion to the relevant person(s) promptly in the format required.</p> <p>5.4. Record and report any additional faults noticed during the course of their work promptly in the format required</p>		
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EVIDENCE REQUIREMENTS

<p>1. You must produce evidence of competently carrying out servicing activities on at least 3 different vehicles which collectively cover the Learning Outcomes.</p>	Evidence Ref:		
<p>2. Your assessor must physically observe you in your normal workplace carrying out a range of servicing activities on at least 1 occasion.</p>	Observation Ref:		

<p>ASSESSOR SIGNATURE:</p>	<p>PIN NO:</p>	<p>DATE:</p>
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UNIT REF: MC01K

UNIT TITLE: KNOWLEDGE OF ROUTINE MOTORCYCLE MAINTENANCE

Level: 2

Route: Knowledge

Credit Value: 2

GLH: 20

Mapping: This unit is mapped to the IMI NOS MC01**Rationale:** This unit enables the learner to develop an understanding of conducting routine maintenance, adjustment and replacement activities as part of the periodic servicing of motorcycles.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand how to carry out routine motorcycle maintenance	1.1. Explain how to conduct a scheduled motorcycle routine examination and assessment against the motorcycle manufacturers specification, legal and road safety requirements 1.2. Identify the different systems to be inspected while carrying out motorcycle routine maintenance. 1.3. Identify adjustments that need to be carried out on a motorcycle routine maintenance
2. Understand the procedures required to carry out routine motorcycle maintenance	2.1. Describe the procedures used for checking the condition and serviceability of motorcycle units and components 2.2. Describe the procedures used for checking gaps and clearances 2.3. Describe the procedures for checking and replenishing fluid levels 2.4. Describe the procedures for checking and replacing lubricants 2.5. Explain the procedure for reporting cosmetic damage to motorcycle components and units outside normal service items 2.6. Identify the operating specifications for the systems being checked while carrying out motorcycle routine maintenance

Content:
Motorcycle maintenance, inspection and adjustment and record findings

- a. Motorcycle inspection techniques used in routine maintenance including:
 - i. aural
 - ii. visual and functional assessments on engine systems
 - iii. visual and functional assessments on transmission power train
 - iv. chassis systems
 - v. wheels and tyres
 - vi. electrical and electronic systems
 - vii. motorcycle frame and components
- b. The procedures used for inspecting the condition and serviceability of the following:
 - i. filters
 - ii. drive belts
 - iii. cables
 - iv. brake linings
 - v. pads
 - vi. ignition components
 - vii. hoses
 - viii. tyres
 - ix. lights
 - x. chain and sprockets
 - xi. steering and suspension
 - xii. battery and charging
- c. The procedures used for checking gaps and clearances:
 - i. ignition components
 - ii. carburettor
 - iii. valve clearances
 - iv. clutch
 - v. drive train
 - vi. brakes
- d. Preparation and use appropriate use of equipment to include:
 - i. test instruments
 - ii. emission equipment
 - iii. wheel alignment
 - iv. beam setting equipment
 - v. tyre tread depth gauges
- e. Procedures for checking and replenishing fluid levels:
 - i. oil
 - ii. water
 - iii. hydraulic fluids
 - iv. greases
- f. Procedures for checking and replacement of lubricants:
 - i. replace oil filters
 - ii. check levels
 - iii. types of oil
 - iv. cleanliness
 - v. disposal of old oil and filters
- g. Procedures for carrying out adjustments on motorcycle systems or components:
 - i. clearances
 - ii. settings
 - iii. alignment
 - iv. operational performance (engine idle, exhaust gas)
- h. Procedures for checking electrical systems:
 - i. operation
 - ii. security
 - iii. performance

Content: contd

- i. Importance and process of detailed inspection procedures:
 - i. following inspection checklists
 - ii. checking conformity to manufacturer's specifications
 - iii. UK and European legal requirements
- j. Importance and process of completing all relevant documentation relating to motorcycle maintenance:
 - i. inspection records
 - ii. job cards
 - iii. motorcycle repair records
 - iv. motorcycle service history

The need to use motorcycle protection prior to service and repair

- a. Requirements and methods used for protecting:
 - i. motorcycle body panels
 - ii. paint surfaces
 - iii. chrome surfaces

The need to check the motorcycle prior to routine maintenance

- a. The need to inspect the motorcycle following routine maintenance:
 - i. professional presentation of motorcycle
 - ii. customer perceptions
- b. The basic checks of motorcycle following routine maintenance:
 - i. removal of oil and grease marks
 - ii. body panels
 - iii. chrome
 - iv. paint surfaces
 - v. motorcycle controls
 - vi. re-instatement of components

Different systems to be inspected while carrying out motorcycle routine maintenance.

- a. Engine and power train systems
- b. Chassis systems
- c. wheels and tyres
- d. Electrical and electronic systems
- e. Motorcycle frame and components



UNIT REF: MC02.1K	UNIT TITLE: KNOWLEDGE OF MOTORCYCLE INTERNAL ENGINE SYSTEMS
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Level: 2	Route: Knowledge	Credit Value: 3	GLH: 20
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Mapping: This unit is mapped to the IMI NOS MC02

Rationale: This unit enables the learner to develop an understanding of the construction and operation of common engine power train mechanical, lubrication and cooling systems, clutch and transmission systems.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand how the main motorcycle engine mechanical systems operate	1.1. Identify motorcycle engine mechanical system components 1.2. Describe the construction and operation of motorcycle engine mechanical systems. 1.3. Compare key engine mechanical system components and assemblies against alternatives to identify differences in construction and operation 1.4. Identify the key engineering principles that are related to engine mechanical systems. <ul style="list-style-type: none"> a compression ratio's b cylinder capacity c power d torque 1.5. State common terms used in motorcycle engine mechanical system design. <ul style="list-style-type: none"> a tdc b bdc c stroke d bore
2. Understand how motorcycle engine Lubrication systems operate	2.1. Identify motorcycle engine lubrication system components 2.2. Describe the construction and operation of motorcycle engine lubrication components and systems. 2.3. Compare key motorcycle engine lubrication system components and assemblies to identify differences in construction and operation 2.4. Identify the key engineering principles that are related to motorcycle engine lubrication systems. <ul style="list-style-type: none"> a. classification of lubricants b. properties of lubricants c. methods of reducing friction 2.5. State common terms used in motorcycle engine lubrication system design

<p>3. Understand how motorcycle engine cooling systems operate</p>	<p>3.1. Identify motorcycle engine cooling system components</p> <p>3.2. Describe the construction and operation of motorcycle engine cooling systems</p> <p>3.3. Compare key motorcycle engine cooling system components and assemblies against alternatives to identify differences in construction and operation</p> <p>3.4. Identify the key engineering principles that are related to motorcycle engine cooling systems</p> <ol style="list-style-type: none"> a. heat transfer b. linear and cubical expansion c. specific heat capacity d. boiling point of liquids <p>3.5. State common terms used in key motorcycle engine cooling system design</p>
<p>4. Understand how motorcycle clutch and transmission systems operate</p>	<p>4.1. Identify motorcycle clutch and transmission system components</p> <p>4.2. Describe the construction and operation of motorcycle clutch and transmission system components</p> <p>4.3. Compare key motorcycle clutch and transmission system components and assemblies against alternatives to identify differences in construction and operation.</p>
<p>5. Understand how to check, replace and test power train systems, units and components</p>	<p>5.1. Describe how to remove and replace power train systems, units and components</p> <p>5.2. Describe common types of testing methods used to check the operation of engine power train systems and their purpose</p> <p>5.3. Explain how to test and evaluate the performance of replacement units against motorcycle specification</p> <p>5.4. Explain common faults found in motorcycle power train systems and their causes</p>

Content:
Engines

- a. Engine types and configurations:
 - i. inline
 - ii. flat
 - iii. vee
 - iv. four-stroke and two-stroke cycle for spark ignition engines
 - v. naturally aspirated and turbo-charged engines
- b. Relative advantages and disadvantages of different engine types and configurations.
- c. Engine components and layouts:
 - i. single (OHC) and multi camshaft (DOHC)
 - ii. single and multi cylinder (2, 3, 4, 6 cylinder types)
 - iii. port design: inlet, transfer and exhaust
- d. Cylinder head layout and design, combustion chamber and piston design.
- e. The procedures used when inspecting engines
- f. The procedures to assess:
 - i. serviceability
 - ii. wear
 - iii. condition
 - iv. clearances
 - v. settings
 - vi. linkages
 - vii. joints
 - viii. fluid systems
 - ix. adjustments
 - x. operation and functionality
 - xi. security
- g. Symptoms and faults associated with mechanical engine operation:
 - i. poor performance
 - ii. abnormal or excessive mechanical noise
 - iii. erratic running
 - iv. low power
 - v. exhaust emissions
 - vi. abnormal exhaust smoke
 - vii. unable to start
 - viii. exhaust gas leaks to cooling system
 - ix. exhaust gas leaks

Lubrication

- a. The advantages and disadvantages of wet and dry systems.
- b. Engine lubrication system:
 - i. splash and pressurised systems
 - ii. pumps
 - iii. pressure relief valve
 - iv. filters
 - v. oil ways
 - vi. oil coolers
- c. Terms associated with lubrication and engine oil:
 - i. full-flow
 - ii. hydrodynamic
 - iii. boundary
 - iv. viscosity
 - v. multi-grade
 - vi. natural and synthetic oil
 - vii. viscosity index
 - viii. multi-grade

Content: contd

- d. The requirements and features of engine oil:
 - i. operating temperatures
 - ii. pressures
 - iii. lubricant grades
 - iv. viscosity
 - v. multi-grade oil
 - vi. additives
 - vii. detergents
 - viii. dispersants
 - ix. anti-oxidants inhibitors
 - x. anti-foaming agents
 - xi. anti-wear
 - xii. synthetic oils
 - xiii. organic oils
 - xiv. mineral oils
- e. Symptoms and faults associated with lubrication systems:
 - i. excessive oil consumption
 - ii oil leaks
 - iii. oil in water
 - iv low or excessive pressure
 - v. oil contamination
- f. The procedures used when inspecting lubrication system

Cooling,

- a. The components, operating principles, and functions of engine cooling systems
- b. Procedures used to remove, replace and adjust cooling system components
 - i. cooling fans and control devices
 - ii. fins and cowlings
 - iii. header tanks, radiators and pressure caps
 - iv expansion tanks hoses, clips and pipes
 - v. thermostats impellers and coolant
- c. The preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement
 - i. system pressure testers
 - ii. pressure cap testers
 - iii. anti-freeze testing equipment
 - iv. chemical tests for the detection of combustion gas
- d. Symptoms and faults associated with cooling systems:
 - i. water leaks
 - ii. water in oil
 - iii. blocked fins
 - iv excessively low or high coolant temperature
- e. The procedures used when inspecting
 - i. cooling systems

Clutch

- a. The components, operating principles, and functions of clutch's
 - i. wet clutch
 - ii. dry clutch
 - iii. centrifugal
 - iv. cable control
 - v. hydraulic control
- b. Procedures used to remove, replace and adjust clutch systems and components
- c. The preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement

Content: contd

- d. Symptoms and faults associated with clutch systems
 - i. slip
 - ii. drag

Transmission

- a. The components, operating principles, and function of transmission systems
 - i. conventional gear
 - ii. CVT
 - iii. automatic
- b. The operating components within transmission systems
 - i. gears
 - ii. shafts
 - iii. selectors
 - iv. shift lever and drum mechanisms
 - v. bearings
 - vi. pulleys
- c. The preparation and method of use of appropriate specialist equipment used to evaluate transmission system performance following component replacement
- d. Procedures used to remove, replace and adjust transmission systems and components
- e. Symptoms and faults associated with transmission systems
 - i. abnormal noises
 - ii. vibration
 - iii. fluid leaks
 - iv wear
 - v. gear selection

General

- a. The preparation, testing and use of tools and equipment used for:
 - i. dismantling
 - ii. removal and replacement of engine mechanical and power train system components
- b. Appropriate safety precautions:
 - i. PPE
 - ii. motorcycle protection when dismantling
 - iii. removal and replacing engine mechanical and power train units and components
- c. The important of logical and systematic processes.
- d. The inspection and testing of engine mechanical and power train units and components.
- e. The preparation of replacement units for re-fitting or replacement.
- f. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements.
- g. Refitting procedures.
- h. The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.
- i. The inspection and re-instatement of the motorcycle following repair to ensure customer satisfaction;
 - i. cleanliness of motorcycle
 - ii. security of components and fittings
 - iii. re-instatement of components and fittings

Construction and operation of motorcycle engine mechanical systems

- a. Four stroke
- b. Two stroke

Key engineering principles that are related to engine mechanical systems

- a. Compression ratio's
- b. Volumetric efficiency
- c. Cylinder capacity

Content: contd

Common terms used in motorcycle engine mechanical system design

- a. TDC
- b. BDC
- c. Stroke
- d. Bore
- e. Ports

Construction and operation of motorcycle engine lubrication components and systems

- a. Full flow
- b. By pass
- c. Wet sump
- d. Dry sump
- e. Total loss

Key engineering principles that are related to motorcycle engine lubrication systems

- a. Classification of lubricants
- b. Properties of lubricants
- c. Methods of reducing friction

Common terms used in motorcycle engine lubrication system design

Identify motorcycle engine cooling system components

- a. Air cooling
- b. Liquid cooling

Key engineering principles that are related to motorcycle engine cooling systems

- a. Heat transfer
- b. Linear and cubical expansion
- c. Specific heat capacity
- d. Boiling point of liquids

Construction and operation of motorcycle clutch and transmission system components

- a. Dry clutch
- b. Wet clutch
- c. Constant mesh
- d. CVT
- e. Automatic
- f. Chain and sprocket
- g. Shaft and gear
- h. Belt and pulley



UNIT REF: MC02.2K	UNIT TITLE: KNOWLEDGE OF MOTORCYCLE FUEL, IGNITION, AIR AND EXHAUST SYSTEM UNITS AND COMPONENTS
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Level: 2	Route: Knowledge	Credit Value: 3	GLH: 20
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Mapping: This unit is mapped to the IMI NOS MC02

Rationale: This unit enables the learner to develop an understanding of the construction and operation of common fuel, ignition, air and exhaust systems. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand how motorcycle engine fuel systems operate	1.1. Identify motorcycle engine fuel system components 1.2. Describe the construction and operation of motorcycle engine fuel systems 1.3. Compare key motorcycle engine fuel system components and assemblies against alternatives to identify differences in construction and operation 1.4. Identify the key engineering principles that are related to motorcycle engine fuel systems <ul style="list-style-type: none"> a. properties of fuels b. combustion processes c. exhaust gas constituents 1.5. State common terms used in motorcycle engine fuel system design
2. Understand how motorcycle engine ignition systems operate	2.1. Identify motorcycle engine ignition system components 2.2. Describe the construction and operation of fundamental motorcycle engine ignition systems 2.3. Compare key motorcycle engine ignition system components and assemblies against alternatives to identify differences in construction and operation 2.4. Identify the key engineering principles that are related to motorcycle engine ignition systems <ul style="list-style-type: none"> a. flame travel b. ignition timing 2.5. State common terms used in key motorcycle engine ignition system design

<p>3. Understand how motorcycle engine air supply and exhaust systems operate</p>	<p>3.1. Identify motorcycle engine air supply and exhaust system components</p> <p>3.2. Describe the construction and operation of motorcycle engine air supply and exhaust systems</p> <p>3.3. Compare key motorcycle air supply and exhaust system components and assemblies against alternatives to identify differences in construction and operation</p> <p>3.4. Identify the key engineering principles that are related to motorcycle engine air supply and exhaust systems</p> <ul style="list-style-type: none"> a. sound absorption b. reduction of harmful emissions <p>3.5. State common terms used in key motorcycle engine air supply and exhaust system design</p>
<p>4. Understand how to check, replace and test fuel, ignition, air and exhaust systems, units and components</p>	<p>4.1. Describe how to remove and replace fuel, ignition, air and exhaust systems, units and components</p> <p>4.2. Describe common types of testing methods used to check the operation of fuel, ignition, air and exhaust systems and their purpose</p> <p>4.3. Explain how to test and evaluate the performance of replacement units against motorcycle specification</p> <p>4.4. Explain common faults found in motorcycle fuel, ignition, air and exhaust systems, units and components and their causes</p>

Content:

Fuel - Petrol

- a. The function and layout of carburettor systems:
 - i. carburettor, single and multi-type
 - ii. fuel tank and control lever
 - iii. fuel pumps
- b. The operation of carburettor systems
 - i. carburettor, single and multi-type
 - ii. float chamber and designs
 - iii. vacuum and piston assembly
 - iv. needles and jets
 - v. adjustment for idle and mixture
 - vi. choke and enrichment device
 - vii. fuel tank and control lever
 - viii. fuel pumps
- c. The function of petrol injection systems and components
 - i. petrol injection systems
 - ii. injection components
 - iii. injection pump
 - iv. pump relay
 - v. injector valve
 - vi. air flow sensor
 - vii. throttle potentiometer
 - viii. idle speed control valve
 - ix. coolant sensor
 - x. MAP and air temperature sensors
 - xi. mechanical control devices
 - xii. electronic control units

Content: contd

- d. The operation petrol injection systems and components:
 - i. injection pump
 - ii. pump relay
 - iii. injector valve
 - iv. air flow sensor
 - v. throttle potentiometer
 - vi. idle speed control valve
 - vii. coolant sensor
 - viii. MAP and air temperature sensors
 - ix. electronic control units
 - x. fuel pressure regulators
 - xi. fuel pump relays
 - xii. lambda exhaust sensors
 - xiii. flywheel and camshaft sensors
 - xiv. air flow sensors (air flow meter and air mass meter)
- e. The procedures used when inspecting petrol system
- f. The chemically correct air/fuel ratio for petrol engines
- g. weak and rich air/fuel ratios for petrol engines.
- h. Exhaust composition and by-products for chemically correct, rich and weak air/fuel ratios of petrol engines:
 - i. water vapour (H₂O)
 - ii. nitrogen (N)
 - iii. carbon monoxide (CO)
 - iv. carbon dioxide (CO₂)
 - v. carbon (C)
 - vi. hydrocarbon (HC)
 - vii. oxides of nitrogen (NO_x, NO₂, NO) and particulates
- I. Symptoms and faults associated with fuel systems
 - i. erratic running
 - ii. weak mixture
 - iii. rich mixture
 - iv. two stroke mixtures
 - v. excessive smoke
 - vi. leaks
 - vii. failure to start
 - viii. poor economy
 - ix. failure to meet emission control

Ignition

- a. The layout of ignition systems,
- b. Ignition circuits and components:
 - i. LT Circuit
 - ii. battery
 - iii. ignition switch
 - iv. electronic trigger devices
 - v. HT Circuit
 - vi. spark plugs (reach, heat range, electrode features)
 - vii. ignition leads
 - viii. ignition coil
 - ix. ignition timing advance system
- c. The operation electronic system components:
 - i. amplifiers
 - ii. triggering systems
 - iii. inductive pick-ups
 - iv. amplifier units.
 - v. control units

Content: contd

- d. Ignition terminology:
 - i. dwell angle
 - ii. dwell time
 - iii. advance and retard of ignition timing
 - iv. static and dynamic ignition timing
- e. The operation of electronic ignition systems under various conditions and loads to include:
 - i. engine idling
 - ii. during acceleration
 - iii. under full load
 - iv. cruising
 - v. overrun
 - vi. cold starting
- f. Basic principle of engine management systems:
 - i. closed loop system
 - ii. integrated ignition
 - iii. injection systems
 - iv. sensors
- h. The procedures used when inspecting
 - i. ignition system
 - ii. engine management
 - iii. sensors
- l. Symptoms and faults associated with ignition system operation
 - i. failure to start hot or cold
 - ii. exhaust emissions
 - iii. poor performance
 - iv. ignition noise
 - v. misfire
 - vi. damp

Air supply and exhaust systems

- a. The construction and purpose of air filtration systems.
- b. The operating principles of air filtration systems.
- c. The construction and purpose of the exhaust systems.
- d. The operating principles of the systems.
- e. Exhaust system design to include silencers and catalytic converters.
- f. The procedures used when inspecting induction, air filtration and exhaust systems
- g. Symptoms and faults associated with air and exhaust systems

General

- j. The preparation, testing and use of tools and equipment used for:
 - i. dismantling
 - ii. removal and replacement of engine units and components
- k. Appropriate safety precautions:
 - i. PPE
 - ii. motorcycle protection when dismantling
 - iii. removal and replacing engine units and components
- l. The important of logical and systematic processes.
- m. The inspection and testing of engine units and components.
- n. The preparation of replacement units for re-fitting or replacement.
- o. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements.
- p. Refitting procedures.
- q. The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.
- r. The inspection and re-instatement of the motorcycle following repair to ensure customer satisfaction;
 - i. cleanliness of motorcycle interior and exterior
 - ii. security of components and fittings
 - iii. re-instatement of components and fittings

Content: contd**Construction and operation of motorcycle engine fuel systems**

- a. Carburettor
- b. Multi point injection

Key engineering principles that are related to motorcycle engine fuel systems

- a. Properties of fuels
- b. Combustion processes
- c. Exhaust gas constituents

Key engineering principles that are related to motorcycle engine ignition systems

- a. Flame travel
- b. Ignition timing
- c. Voltages

Construction and operation of motorcycle engine air supply and exhaust systems

- a. Manifolds
- b. Filters
- c. Silencers, including two stroke
- d. Catalytic converter

Key engineering principles that are related to motorcycle engine air supply and exhaust systems

- a. Sound absorption
- b. Reduction of harmful emissions



Learner Name:

UNIT REF: MC02C	UNIT TITLE: COMPETENCY IN MOTORCYCLE INTERNAL ENGINE SYSTEMS
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Level: 2	Route: Competence	Credit Value: 10	GLH: 90
Mapping: This unit is mapped to the IMI NOS MC02			
Rationale: This unit allows the learner to develop skills to remove and replace motorcycle engine power train mechanical, lubrication, cooling systems, clutch and transmission systems.			

LEARNING OUTCOMES	ASSESSMENT CRITERIA	Ref No	Date
The Learner will:	The Learner can:		
1. Be able to work safely when carrying out removal and replacement activities	1.1. Use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities 1.2. Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment		
2. Be able to use relevant information to carry out the task	2.1. Select suitable sources of technical information to support motorcycle engine power train unit and component removal and replacement activities including: a. motorcycle technical data b. removal and replacement procedures c. legal requirements 2.2. Use technical information to support motorcycle engine power train unit and component removal and replacement activities		
3. Be able to use appropriate tools and equipment	3.1. Select the appropriate tools and equipment necessary for removal and replacement of motorcycle engine power train systems 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 to remove and replace motorcycle engine systems		
4. Be able to carry out removal and replacement of motorcycle engine power train units and components.	4.1. Remove and replace the motorcycle engine power train systems and components, adhering to the correct specifications and tolerances for the motorcycle and following: a. the manufacturer's approved and workplace removal and replacement methods b. recognised researched repair methods c. health and safety requirements. 4.2 Check that replaced motorcycle engine power train units and components conform to the motorcycle operating specification and any legal requirements 4.3 Use suitable testing methods to evaluate the performance of the reassembled system 4.4 Ensure that the reassembled motorcycle engine power train systems performs to the motorcycle operating specification and meets any legal requirements 4.5. Work to the specified timescale for the activity		



<p>5. Be able to record information and make suitable recommendations</p>	<p>5.1. Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required</p> <p>5.2. Make suitable and justifiable recommendations for cost effective repairs</p> <p>5.3. Identify and report any expected delays in completion to the relevant person(s) promptly in the format required.</p> <p>5.4. Record and report any additional faults noticed during the course of their work promptly in the format required</p>		
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EVIDENCE REQUIREMENTS

<p>1. You must produce evidence of removing and replacing units or components from 4 of the 6* systems listed below. The evidence must come from work in your normal workplace.</p>	Evidence Ref:
cooling systems	
air supply and exhaust systems	
fuel and ignition systems	
lubrication systems (not including standard external filters)	
transmission systems	
clutch systems	
<p>2. You must be observed by your assessor on at least 1 occasion removing and replacing components or units.</p>	Observation Ref:

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of **all** the systems listed above.

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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Learner Name:

UNIT REF: MC03C	UNIT TITLE: COMPETENCY IN REMOVING AND REPLACING MOTORCYCLE ELECTRICAL UNITS AND COMPONENTS
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Level: 2	Route: Competence	Credit Value: 10	GLH: 90
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Mapping: This unit is mapped to the IMI NOS MC03

Rationale: This unit allows the learner to develop skills to remove and replace motorcycle electrical system components. It also covers the evaluation of performance of the replaced units and systems

LEARNING OUTCOMES	ASSESSMENT CRITERIA	Ref No	Date
The Learner will:	The Learner can:		
1. Be able to work safely when carrying out removal and replacement activities	1.1. Use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities 1.2. Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment		
2. Be able to use relevant information to carry out the task	2.1. Select suitable sources of technical information to support motorcycle electrical unit and component removal and replacement activities including: <ul style="list-style-type: none"> a. motorcycle technical data and codes b. removal and replacement procedures c. legal requirements 2.2. Use technical information to support motorcycle electrical unit and component removal and replacement activities		
3. Be able to use appropriate tools and equipment	3.1. Select the appropriate tools and equipment necessary for removal and replacement of motorcycle electrical system 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 to remove and replace motorcycle electrical systems		



<p>4. Be able to carry out removal and replacement of motorcycle electrical units and components.</p>	<p>4.1. Remove and replace the motorcycle electrical systems and components, adhering to the correct specifications and tolerances for the motorcycle and following:</p> <ul style="list-style-type: none"> a. the manufacturer's approved and workplace removal and replacement methods b. recognised researched repair methods c. health and safety requirements. <p>4.5 Ensure that replaced motorcycle electrical units and components conform to the motorcycle operating specification and any legal requirements</p> <p>4.6 Use suitable testing methods to evaluate the performance of the reassembled system</p> <p>4.7 Ensure that the reassembled motorcycle electrical systems performs to the motorcycle operating specification and meets any legal requirements</p> <p>4.8 Work to the specified timescale for the activity</p>		
<p>5. Be able to record information and make suitable recommendations</p>	<p>5.1. Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required</p> <p>5.2. Make suitable and justifiable recommendations for cost effective repairs</p> <p>5.3. Identify and report any expected delays in completion to the relevant person(s) promptly in the format required.</p> <p>5.4. Record and report any additional auto electrical faults noticed during the course of their work promptly in the format required</p>		



EVIDENCE REQUIREMENTS

<p>1. You must produce evidence of removing and replacing at least 5 units or components, each from a different electrical system. At least 4 of these 5 pieces of evidence must come from work in your normal workplace.</p>	Evidence Ref:	
<p>a. lighting</p>		
<p>b. security and alarm</p>		
<p>c. information and entertainment</p>		
<p>d. telephone and two-way communication</p>		
<p>e. monitoring and instrumentation systems</p>		
<p>f. engine starting</p>		
<p>g. battery charging</p>		
<p>2. You must be observed by your assessor on at least 1 occasion in your normal workplace carrying out the removal and replacement of at least 1 of the following*:</p>	Observation Ref:	
<p>a. engine starting</p>		
<p>b. battery charging</p>		
<p>3. You must be observed by your assessor on at least 1 occasion in your normal workplace successfully carrying out the removal and replacement of electrical units and components *:</p>	Observation Ref:	
<p>a. lighting</p>		
<p>b. security and alarm</p>		
<p>c. information and entertainment</p>		
<p>d. telephone and two-way communication</p>		
<p>e. monitoring and instrumentation systems</p>		

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of **all** the systems listed above.

Simulated activities **will be** acceptable to assess candidates' removal and replacement competence on no more than **1** occasion.

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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UNIT REF: MC03K	UNIT TITLE: KNOWLEDGE OF REMOVING AND REPLACING MOTORCYCLE ELECTRICAL UNITS AND COMPONENTS
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Level: 2	Route: Knowledge	Credit Value: 6	GLH: 45
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Mapping: This unit is mapped to the IMI NOS MC03

Rationale: This unit enables the learner to develop an understanding of the principles, construction and operation and testing methods of common electrical and electronic systems and components. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance

LEARNING OUTCOMES	ASSESSMENT CRITERIA
<p>The Learner will:</p> <p>1. Understand motorcycle electrical and electronic principles</p>	<p>The Learner can:</p> <p>1.1. Identify electrical symbols and units found in motorcycle circuits</p> <p>1.2. Describe how to interpret motorcycle wiring diagrams</p> <p>1.3. Describe the operation of key motorcycle circuit safety protection devices and why these are necessary</p> <p>1.4. Describe motorcycle earthing principles and earthing methods</p> <p>1.5. Identify the use of different cables and connectors used in motorcycle circuits</p> <p>1.6. Describe the operation of electrical and electronic sensors and actuators and their application</p> <p>1.7. Describe the key electrical and electronic control principles that are related to motorcycle electrical circuits</p> <p>1.8. State common terms used in motorcycle electrical circuits</p>
<p>2. Understand how motorcycle batteries, starting and charging systems operate</p>	<p>2.1. Identify motorcycle batteries, starting and charging system components</p> <p>2.2. Describe the construction and operation of motorcycle batteries, starting and charging system components</p> <p>2.3. Compare motorcycle batteries, starting and charging system components and assemblies against alternatives to identify differences in construction and operation</p> <p>2.4. State common terms used in conjunction with motorcycle batteries, starting and charging systems</p>



3. Understand how motorcycle auxiliary electrical systems operate	3.1. Identify motorcycle auxiliary system components 3.2. Describe the construction and operation of motorcycle auxiliary systems 3.3. Compare key motorcycle auxiliary system components and assemblies against alternatives to identify differences in construction and operation 3.4. State common terms used in motorcycle auxiliary system design
4. Understand how to check, replace and test electrical and electronic systems, units and components	4.1. Describe how to remove and electrical and electronic systems, units and components 4.2. Describe common types of testing methods used to check the operation of electrical and electronic systems and their purpose 4.3. Explain how to test and evaluate the performance of replacement units against motorcycle specification 4.4. Identify common faults found in motorcycle electrical and electronic systems and their causes

Content:**Electrical/Electronic Principles**

a. Electrical units:

- i. volt (electrical pressure)
- ii. ampere (electrical current)
- iii. ohm (electrical resistance)
- iv. watt (power)

b. The requirements for an electrical circuit:

- i. battery
- ii. cables
- iii. switch
- iv. current consuming device
- v. continuity

c. The direction of current flow and electron flow.

d. Series and parallel circuits to include:

- i. current flow
- ii. voltage of components
- iii. volt drop
- iv. resistance
- v. the effect on circuit operation of open circuit component(s)

e. Earth and insulated return systems.

f. Cable sizes and colour codes.

g. Different types of connectors, terminals and circuit protection devices.

h. Common electrical and electronic symbols.

i. The meaning of:

- i. short circuit
- ii. open circuit
- iii. bad earth
- iv. high resistance
- v. electrical capacity

Content: contd

- j. The principles of motorcycle electronic systems and component.
- k. Interpret motorcycle wiring diagrams to include:
 - i. motorcycle lighting
 - ii. auxiliary circuits
 - iii. indicators
 - iv. starting and charging systems
- l. Function and construction of electrical components including:
 - i. circuit relays
 - ii. bulb types
 - iii. cooling fan
 - iv. circuit protection
- m. The safety precautions when working on electrical and electronic systems to include:
 - i. disconnection and connection of battery
 - ii. avoidance of short circuits
 - iii. power surges
 - iv. prevention of electric shock
 - v. protection of electrical and electronic components
 - vi. protection of circuits from overload or damage
- n. The set-up and use of:
 - i. digital and analogue multi-meters
 - ii. voltmeter
 - iii. ammeter
 - iv. ohmmeter
 - v. oscilloscope
 - vi. manufacturer's dedicated test equipment
- o. Electrical and electronic checks for electrical and electronic systems to include:
 - i. connections
 - ii. security
 - iii. functionality
 - iv. performance to specifications
 - v. continuity, open circuit
 - vi. short circuit
 - vii. high resistance
 - viii. volt drop
 - ix. current consumption
 - x. output patterns (oscilloscope)
- p. Symptoms and faults associated with electrical and electronic systems to include:
 - i. high resistance
 - ii. loose and corroded connections
 - iii. short circuit
 - iv. excessive current consumption
 - v. open circuit
 - vi. malfunction
 - vii. poor performance
 - viii. battery faults to include flat battery
 - ix. failure to hold charge
 - x. low state of charge
 - xi. overheating
 - xii. poor starting

Content: contd
Battery and Charging

- a. The construction and operation of motorcycle batteries including:
 - i. low maintenance and maintenance free
 - ii. lead acid and nickel cadmium types
 - iii. cells
 - iv. separators
 - v. plates
 - vi. electrolyte
- b. The operation of the motorcycle charging system:
 - i. alternator
 - ii. rotor
 - iii. stator
 - iv. slip ring
 - v. brush assembly
 - vi. three phase output
 - vii. diode rectification pack
 - viii. voltage regulation
 - ix. phased winding connections
 - x. cooling fan
 - xi. alternator drive

Starting

- a. The layout, construction and operation of engine starting systems:
- b. The function and operation of the following components:
 - i. starter motor
 - ii. starter clutch mechanism
 - iii. pinion
 - iv. starter solenoid
 - v. clutch and gear safety switch
 - vi. ignition/starter switch
 - vii. stand switches
 - viii. starter relay (if appropriate)

Lighting

- a. Function and construction of electrical components including:
 - i. front and tail lamps
 - ii. main and dip beam headlamps
 - iii. lighting and dip switch
 - iv. directional indicators
 - v. flash
- b. The circuit diagram and operation of components for:
 - i. side and tail lamps
 - ii. headlamps
 - iii. direction indicators
- c. The statutory requirements for motorcycle lighting when using a motorcycle on the road.
- d. Headlamp adjustment and beam setting.

Content:
Auxiliary Systems

- a. Function and construction of electrical components including:
 - i. anti theft devises
 - ii. horn
 - iii. heated grips
 - iv. power screen
- b. The circuit diagram and operation of components for:
 - i. anti theft devises
 - ii. horn
 - iii. heated grips
 - iv. power screen

General

- a. The preparation, testing and use of:
 - i. tools and equipment
 - ii. electrical meters and equipment used for dismantling
 - iii. removal and replacement of electrical and electronic systems and components
- b. Appropriate safety precautions:
 - i. PPE
 - ii. motorcycle protection when dismantling
 - iii. removal and replacing electrical and electronic components and systems
- c. The important of logical and systematic processes.
- d. Preparation of replacement units for re-fitting or replacement electrical and electronic components and systems.
- e. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance, safety requirements.
- f. Refitting procedures.
- g. The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
- h. Inspection and re-instatement of the motorcycle following repair to ensure:
 - i. customer satisfaction
 - ii. cleanliness of motorcycle interior and exterior
 - iii. security of components and fittings
 - iv. re-instatement of components and fittings

Construction and operation of motorcycle auxiliary systems auxiliary systems to include:-

- a. Lighting systems
- b. Security and alarm systems
- c. Comfort and convenience systems
- d. Information system
- e. Communication systems
- f. Monitoring and instrumentation systems



Learner Name:

UNIT REF: MC04C	UNIT TITLE: COMPETENCY IN REMOVING AND REPLACING MOTORCYCLE CHASSIS UNITS AND COMPONENTS
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Level: 2	Route: Competence	Credit Value: 10	GLH: 90
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Mapping: This unit is mapped to the IMI NOS MC04

Rationale: This unit allows the learner to develop skills to remove and replace motorcycle steering, suspension and braking units (including wheels and tyres). It also covers the evaluation of performance of the replaced units and systems

LEARNING OUTCOMES	ASSESSMENT CRITERIA	Ref No	Date
The Learner will:	The Learner can:		
1. Be able to work safely when carrying out removal and replacement activities	1.1. Use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities 1.2. Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment		
2. Be able to use relevant information to carry out the task	2.1. Select suitable sources of technical information to support motorcycle chassis unit and component removal and replacement activities including: <ul style="list-style-type: none"> a. motorcycle technical data b. removal and replacement procedures c. legal requirements 2.2. Use technical information to support motorcycle chassis unit and component removal and replacement activities		
3. Be able to use appropriate tools and equipment	3.1. Select the appropriate tools and equipment necessary for removal and replacement of motorcycle chassis systems including: <ul style="list-style-type: none"> a. steering b. suspension c. braking d. wheels & tyres 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 to remove and replace motorcycle chassis systems		



<p>4. Be able to carry out removal and replacement of motorcycle chassis units and components.</p>	<p>4.1 Remove and replace the motorcycle chassis systems and components, adhering to the correct specifications and tolerances for the motorcycle and following:</p> <ul style="list-style-type: none"> a. the manufacturer's approved removal and replacement methods b. recognised researched repair methods c. health and safety requirements. <p>4.2. Ensure that replaced motorcycle chassis units and components conform to the motorcycle operating specification and any legal requirements</p> <p>4.3. Use suitable testing methods to evaluate the performance of the reassembled system</p> <p>4.4. Ensure that the reassembled motorcycle chassis system performs to the operating specification and meets any legal requirements</p> <p>4.5 Work to the specified timescale for the activity</p>		
<p>5 Be able to record information and make suitable recommendations</p>	<p>5.1. Produce work records that are accurate, completed and passed to the relevant person(s) promptly in the format required</p> <p>5.2. Make suitable and justifiable recommendations for cost effective repairs</p> <p>5.3. Identify and report any expected delays in completion to the relevant person(s) promptly in the format required.</p> <p>5.4. Record and report any additional faults noticed during the course of their work promptly in the format required</p>		



EVIDENCE REQUIREMENTS

1. You must produce evidence of removing and replacing 4 different units or components in total which must include items from steering, suspension and braking systems. Your evidence must include demonstration of competence in each aspect of mechanical, electrical and hydraulic/fluid units or component removal and replacement.	Evidence Ref:
2. You must be observed in your normal workplace on at least 1 occasion successfully removing and replacing units and components from one of the following systems:	Observation Ref:
steering	
suspension	
braking	

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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UNIT REF: MC04K	UNIT TITLE: KNOWLEDGE OF REMOVING AND REPLACING MOTORCYCLE CHASSIS UNITS AND COMPONENTS
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Level: 2	Route: Knowledge	Credit Value: 6	GLH: 45
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Mapping: This unit is mapped to the IMI NOS MC04

Rationale: This unit enables the learner to develop an understanding of the construction and operation of common steering, suspension and braking systems (including wheels and tyres). It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand how motorcycle steering and suspension systems operate	1.1. Identify motorcycle and suspension system components 1.2. Describe the construction and operation of motorcycle steering and suspension systems 1.3. Compare key motorcycle steering and suspension system components and assemblies against alternatives to identify differences in construction and operation 1.4. Identify the key engineering principles that are related to motorcycle steering and suspension systems <ul style="list-style-type: none"> a. steering angles b. hydraulic forces c. stress and strain 1.5. State common terms used in motorcycle steering and suspension system design
2. Understand how motorcycle braking systems operate	2.1. Identify motorcycle braking system components 2.2. Describe the construction and operation of motorcycle braking systems 2.3. Compare key motorcycle braking system components and assemblies against alternatives to identify differences in construction and operation 2.4. Identify the key engineering principles that are related to motorcycle braking systems <ul style="list-style-type: none"> a. laws of friction b. hydraulics c. properties of fluids d. properties of air e. braking efficiency 2.5. State common terms used in motorcycle braking system design

<p>3. Understand how motorcycle wheel and tyres systems operate</p>	<p>3.1. Identify motorcycle wheel and tyre components</p> <p>3.2. Describe the construction and operation of motorcycle wheels and tyres</p> <p>3.3. Compare key motorcycle wheel and tyre components and assemblies against alternatives to identify differences in construction and operation</p> <p>3.4. Identify the key engineering principles that are related to motorcycle wheel and tyre systems</p> <ul style="list-style-type: none"> a. friction b. un-sprung weight c. dynamic and static balance <p>3.5. State common terms used in motorcycle wheel and tyre design</p>
<p>4. Understand how to check, replace and test chassis units, parts, and components</p>	<p>4.1. Describe how to remove and replace chassis units and components</p> <p>4.2. Describe common types of testing methods used to check the operation of chassis units and components and their purpose</p> <p>4.3. Explain how to test and evaluate the performance of replacement units against vehicle specification</p> <p>4.4. Identify common faults found in motorcycle chassis units and components</p>

Content:

Steering

- a. The action and purpose of steering geometry:
 - i. castor angle
 - ii. trail angle
 - iii. wheel alignment
- b. The following terms associated with steering:
 - i. castor angle
 - ii. trail angle
 - iii. rake angle
 - iv. wheel alignment
- c. The components and layout of steering systems:
 - i. handlebar
 - ii. conventional steering head
 - iii. leading link
 - iv. bearings
 - v. steering stem
 - vi. yolk
- d. The procedures used for inspecting the serviceability and condition of:
 - i. conventional steering head
 - ii. leading link

Content: contd

h. Steering system defects to include:

- i. uneven tyre wear
- ii. steering vibrations
- iii. wear in linkage
- iv. bearing failure
- v. damage linkage
- vi. excessive play
- vii. incorrect fork alignment
- viii. incorrect steering geometry

Suspension

a. The layout and components of suspension systems:

- i. conventional telescopic fork and tube
- ii. upside down telescopic fork and tube
- iii. hossack/Fior (Duolever) fork
- iv. springer fork
- v. leading link

b. The operation of suspension systems and components:

- i. convention telescopic fork and tube
- ii. upside down telescopic fork and tube
- iii. hydraulic damper
- iv. double swinging arm
- v. single swing arm
- vi. mono shock
- vii. adjustable damper
- viii. adjustable spring

c. The advantages of different systems including:

- i. convention telescopic fork and tube
- ii. upside down telescopic fork and tube
- iii. hydraulic damper
- iv. double swinging arm
- v. single swing arm
- vi. mono shock
- vii. adjustable damper
- viii. adjustable spring

d. The forces acting on suspension systems during braking, riding and cornering.

e. The methods of locating the road wheels against braking, driving and cornering forces.

g. Suspension terms:

- i. rebound
- ii. bump
- iii. dive

h. The procedures used for inspecting the serviceability and condition of the suspension system

i. Suspension system defects:

- i. wheel hop
- ii. ride height
- iii. wear
- iv. noises under operation
- v. fluid leakage
- vi. excessive travel
- vii. excessive tyre wear
- viii. poor handling
- ix. worn dampers
- x. worn joints
- xi. damaged linkages

Content: contd
Brakes

- a. The construction and operation of drum brakes:
 - i. leading and trailing shoe construction
 - ii. drum designs
 - iii. cable
 - iv. hydraulic
 - v. self-servo action
 - vi. adjustment
- b. The construction and operation of disc brakes:
 - i. disc pads
 - ii. calliper
 - iii. brake disc
 - iv. ventilated disc
 - v. disc pad retraction
- c. The construction and operation of the hydraulic braking system:
 - i. master cylinders
 - ii. disc brake calliper & pistons
 - iii. brake pipe
 - iv. warning lights
- d. The principles and components of electronic ABS systems, electrical and electronic components.
- e. The requirements and hazards of brake fluid:
 - i. boiling point
 - ii. hygroscopic action
 - iii. manufacturer's change periods
 - iv. fluid classification and rating
 - v. potential to damage paint surfaces
- f. Terms associated with mechanical and hydraulic braking systems:
 - i. braking efficiency
 - ii. brake fade
 - iii. ABS
- g. The procedures used for inspecting the serviceability and condition of the braking system
- h. Braking system defects:
 - i. worn brake shoes or pads
 - ii. worn or scored brake drums
 - iii. worn or scored brake discs
 - iv. abnormal brake noises
 - v. brake judder
 - vi. brake adjustments
 - vii. fluid contamination of brake surfaces
 - viii. antilock brake failure
 - ix. fluid leaks
 - x. poor braking efficiency
 - xi. brake bind
 - xii. brake grab
 - xiii. brake fade

Wheel and Tyres

- a. The construction of different types of tyre:
 - i. radial
 - ii. tread patterns
 - iii. tyre mixing regulations
 - iv. tyre applications

Content: contd

- b. Tyre markings:
 - i. tyre and wheel size markings
 - ii. speed rating
 - iii. direction of rotation
 - iv. profile
 - v. tread-wear indicators
- c. Wheel construction:
 - i. light alloy
 - ii. wire wheels
 - iii. bearing arrangement
 - iv. roller ball
 - v. taper
- d. The procedures used for inspecting the serviceability and condition of:
 - i. tyres & wheels
 - ii. bearings
- e. The defects associated with tyres and wheels:
 - i. abnormal tyre wear
 - ii. cuts
 - iii. side wall damage
 - iv. wheel vibrations

General

The procedures for dismantling, removal and replacement of motorcycle chassis units, parts and system components

- a. The preparation:
 - i. testing and use of tools and equipment
 - ii. electrical meters and equipment used for dismantling
- b. Appropriate safety precautions:
 - i. PPE
 - ii. vehicle protection when dismantling
 - iii. removing and replacing chassis motorcycle chassis units, parts and system components
- c. The important of logical and systematic processes.
- d. The inspection and testing systems and components.
- e. The preparation of replacement units for re-fitting or replacement of motorcycle chassis units, parts and system components Identify the reasons why replacement components and units must meet the original specifications (OES):
 - i. warranty requirements
 - ii. to maintain performance
 - iii. safety requirements
- f. Refitting procedures.
- g. The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
- h. The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
 - i. cleanliness of motorcycle
 - ii. security of components and fittings
 - iii. re-instatement of components and fittings

Construction and operation of motorcycle steering and suspension systems

- a Conventional steering head
- b Leading link
- c Swinging arm
- d Single swing arm

Content: contd**Key engineering principles that are related to motorcycle steering and suspension systems**

- a. Steering geometry
- b. Steering angles
- c. Hydraulic damping
- d. Stress and strain

Key engineering principles that are related to motorcycle steering and suspension systems

- a Steering geometry
- b Steering angles
- c Hydraulic damping
- d Stress and strain

Construction and operation of motorcycle braking systems

- a Cable
- b Hydraulic braking
- c Electronic ABS system

Key engineering principles that are related to motorcycle braking systems

- a Laws of friction
- b Hydraulics
- c Properties of fluids
- d Braking efficiency

Construction and operation of motorcycle wheels and tyres

- a. Tyre construction
- b. Tyre markings
- c. Wheel construction

Key engineering principles that are related to motorcycle wheel and tyre systems

- a Friction
- b Un-sprung weight
- c Dynamic and static balance



Learner Name:

UNIT REF: G8C	UNIT TITLE: COMPETENCY IN IDENTIFYING AND AGREEING MOTOR VEHICLE CUSTOMER SERVICE NEEDS
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Level: 3	Route: Competence	Credit Value: 5	GLH: 40
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Mapping: This unit is mapped to the IMI NOS G8

Rationale: This unit helps the learner to develop competency in order to: gain information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

LEARNING OUTCOMES	ASSESSMENT CRITERIA	Ref No	Date
The Learner will:	The Learner can:		
1. Be able to obtain relevant information from the customer	1.1. Obtain and interpret sufficient, relevant information, from the customer to make an assessment of their needs. 1.2. Clarify customer and vehicle needs by referring to vehicle data and operating procedures		
2. Be able to provide relevant information to the customer	2.1. Provide customers with accurate, current and relevant advice and information, in a form that the customer will understand. 2.2. Demonstrate techniques which encourage customers to ask questions and seek clarification during conversation		
3. Be able to agree work undertaken with the customer	3.1. Summarise and record work agreed with the customer, before accepting the vehicle. 3.2. Implement confirmation of the agreement by ensuring customer understanding		
4. Be able to ensure recording systems are implemented correctly	4.1. Use recording systems which are accurate and complete, in the required format and signed by the customer where necessary 4.2. Perform the next stage in the process by passing on completed records to the correct person promptly. 4.3. Demonstrate correct procedures for customer approval where the contracted agreement is likely to be exceeded.		

EVIDENCE REQUIREMENTS

1. You must produce evidence, including records, to show that you have dealt with 3 different customers .	Evidence Ref		
2. You must be observed by your assessor in your normal workplace dealing with at least 1 customer	Observation Ref:		

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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UNIT REF: G8K	UNIT TITLE: KNOWLEDGE OF HOW TO IDENTIFY AND AGREE MOTOR VEHICLE CUSTOMER SERVICE NEEDS
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Level: 3	Route: Knowledge	Credit Value: 5	GLH: 45
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Mapping: This unit is mapped to the IMI NOS G8

Rationale: This unit enables the learner to develop an understanding of how to gain: information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand legislative and organisational requirements and procedures	1.1. Describe the fundamental legal requirements of current consumer legislation and the consequences of their own actions in respect of this legislation 1.2. Describe the content and limitations of company and product warranties for the vehicles dealt with by their company 1.3. Explain the limits of their own authority for accepting vehicles 1.4. Explain the importance of keeping customers informed of progress 1.5. Describe their workplace requirements for the completion of records 1.6. Explain how to complete and process all the necessary documentation
2. Understand how to communicate and care for customers	2.1. Explain how to communicate effectively with customers 2.2. Describe how to adapt your language when explaining technical matters to non-technical customers 2.3. Explain how to use effective questioning techniques 2.4. Describe how to care for customers and achieve customer satisfaction
3. Understand company products and services	3.1. Describe the range of options available to resolve vehicle problems 3.2. Describe the range and type of services offered by their company 3.3. Explain the effect of resource availability upon the receipt of customer vehicles and the completion work 3.4. Explain how to access costing and work completion time information

Content:
Organisational requirements

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

Principles of customer communication and care.

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

Company products and services

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

Vehicle Information Systems, Servicing and Repair Requirements

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



Content: contd

Consumer legislation: To include:

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



Learner Name:

UNIT REF: MC05C	UNIT TITLE: COMPETENCY IN MOTORCYCLE PREPARATION AND INSPECTION
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Level: 2	Route: Competence	Credit Value: 7	GLH: 60
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Mapping: This unit is mapped to the IMI NOS MC05

Rationale: This unit enables the learner to develop skills in order to carry out preparation activities and inspections on both old and new motorcycle. In accordance of manufacturers and legal requirements.

LEARNING OUTCOMES	ASSESSMENT CRITERIA	Ref No	Date
The Learner will:	The Learner can:		
1. Be able to work safely when carrying out motorcycle preparation activities and inspections	1.1. Use suitable personal protective equipment and use suitable motorcycle coverings throughout all motorcycle inspection activities 1.2. Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment		
2. Be able to use relevant information to carry out preparation activities and inspections of motorcycles	2.1. Select suitable sources of technical information to support motorcycle inspection activities including: <ul style="list-style-type: none"> a. motorcycle technical data b. inspection procedures c. legal requirements 2.2. Use technical information to support motorcycle inspection activities		
3. Be able to use appropriate tools and equipment to carry out preparation activities and inspections of motorcycles	3.1. Select the appropriate tools and equipment necessary for carrying out preparation and inspections 3.2. Ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3. Use the correct tools and equipment in the way specified by manufacturers when carrying out a range of inspections on motorcycle systems		
4. Be able to carry out the preparation activities and inspections of motorcycles	4.1. Carry out motorcycle preparation and inspections using prescribed methods, adhering to the correct specifications and tolerances for the motorcycle 4.2. Ensure that inspected motorcycle conforms to the motorcycle operating specification and any legal requirements 4.3. Ensure any comparison of the motorcycle against specification accurately identifies any differences from the motorcycle specification 4.4. Use suitable testing methods to evaluate the performance of the inspected systems 4.5. Complete all system diagnostic activities within the agreed timescale		



5. Be able to record information and make suitable recommendations	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. Identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 5.4. Record and report any additional faults noticed during the course of their work promptly in the format required		
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EVIDENCE REQUIREMENTS

1. You must produce evidence of carrying out at least 3 different inspections from the following:	Evidence Ref:	
pre-work inspection		
post - work inspection		
pre-delivery inspection		
pre-purchase inspection		
MOT test inspection		
safety inspection		
post repair inspection		
2. You must be observed by your assessor in your normal workplace successfully carrying out an inspection on at least 1 occasion .	Observation Ref:	

ASSESSOR SIGNATURE:	PIN NO:	DATE:
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UNIT REF: MC05K	UNIT TITLE: KNOWLEDGE OF MOTORCYCLE PREPARATION AND INSPECTION
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Level: 2	Route: Knowledge	Credit Value: 2	GLH: 20
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Mapping: This unit is mapped to the IMI NOS MC05

Rationale: This unit enables the learner to develop knowledge in order to carry out preparation activities and inspections of both new and used motorcycles.

LEARNING OUTCOMES	ASSESSMENT CRITERIA
The Learner will:	The Learner can:
1. Understand how to carry out preparation activities and inspections of motorcycles	1.1. Explain the difference between the various motorcycle preparation activities and inspections 1.2. Identify the different systems to be inspected when using inspection methods 1.3. Identify the procedures involved in carrying out the preparation and inspection of motorcycles 1.4. Identify correct conformity of motorcycle systems and condition on motorcycle inspections 1.5. Compare test and inspection results against motorcycle specifications and legal requirements 1.6. Explain how to record and complete the preparation and inspection results in the format required 1.7. Identify the recommendations that can be made based on results of the motorcycle inspections 1.8. Explain the implications of failing to carry out motorcycle preparation and inspection activities correctly 1.9. Explain the implications of signing workplace documentation and motorcycle records 1.10. Explain the procedure for reporting cosmetic damage to motorcycle components and units outside normal inspection items

Content:
Assembly, pre and post work motorcycle inspections

- a. PPE and motorcycle protection relating to:
 - i. motorcycle body panels and frame
 - ii. paint surfaces
 - iii. polished surfaces
 - iv. seats
- b. Assembly, pre and post work motorcycle inspection procedures:
 - i. aural
 - ii. visual and functional assessments on engine
 - iii. engine systems
 - iv. chassis systems
 - v. wheels and tyres
 - vi. transmission system
 - vii. electrical and electronic systems
 - viii. exterior motorcycle body panels and frame
- c. The methods for carrying out inspections for: damage, corrosion, fluid leaks, wear, security, mounting security and condition to include;
 - i. engines and engine systems
 - ii. chassis systems
 - iii. transmission systems
 - iv. brakes
 - v. steering
 - vi. suspension
 - vii. wheels
 - viii. tyres
 - ix. body panels and frame
 - x. electrical and electronic systems and components
 - xi. motorcycle seating and mirrors
 - xii. motorcycle instrumentation
 - xiii. driver controls
- d. Check conformity to manufacturer's specifications and legal requirements.
- e. Completion of documentation to include:
 - i. inspection records
 - ii. job cards
 - iii. motorcycle records
- f. Make recommendations based on results of motorcycle inspections.
- g. The checks necessary to ensure customer satisfaction for:
 - i. motorcycle body panels
 - ii. paint surfaces
 - iii. polished surfaces
 - iv. chromed surfaces
 - v. seats and mirrors
- h. Prepare and use appropriate inspection equipment and tools.
- i. Inspection procedures following inspection checklists.
- j. various motorcycle preparation activities and inspections to include:-
 - i. new motorcycle assembly
 - ii. pre and post work
 - iii. pre-delivery on new and used motorcycles
 - iv. MOT test
 - v. safety
 - vi. post repair



ASSESSOR COMMENTS AND FEEDBACK

Assessor's should comment and give feedback each time they observe a learner or meet with a learner to review evidence. Therefore each time an observation or review of evidence takes place the assessor should enter the date and the evidence number, and make appropriate comments and feedback. Please see the guide below for the type of comments that can be included.

- The following provides guidance as to the type of comments that can be included below.**
1. A description of the various activities being carried out by the learner for each unit.
 2. How the learner has met the Learning Outcomes for each unit.
 3. Questions that you have asked, particularly to cover Evidence Requirements, not demonstrated through performance.
 4. Questions you have asked to ascertain Essential Knowledge.
 5. Issues arising from assessment.
 6. Identification of good or poor performance.
 7. Any action required to further develop the learners knowledge and skills.
 8. Constructive feedback to the learner.

Date	Evidence Ref No.	Assessor Comments: Please ensure your comments are concise.



ASSESSOR COMMENTS AND FEEDBACK

CONTINUATION SHEET

Date	Evidence Ref No.	Assessor Comments: Please ensure your comments are concise.