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Literacy and numeracy profile:

Automotive Light Vehicle Trades

This profile describes literacy and numeracy tasks relevant to technicians who work on light vehicles (e.g. cars and light commercial vehicles). The roles covered by this profile include:

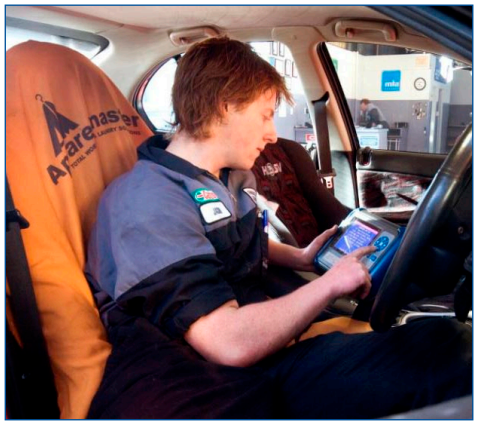
- **Technicians whose work includes routine maintenance and servicing, and simple repairs such as replacing a standard manufactured part.**
- **Technicians whose work includes the routine maintenance and servicing, but who also carry out more complex repairs that involve diagnosing and rectifying a problem.**
- **Technicians with specialist expertise in a specific area e.g. Underbody and General Service, Brake and Clutch systems, Exhaust systems, and Steering and Suspension.**

Reading tasks

"Read" implies that the person reads and understands.

Read signs and short texts

- Part numbers
- Part descriptions
- Vehicle identification numbers (VIN)
- Safety signs
- Measuring tool displays (e.g. tyre pressure gauge, oil pressure gauge)
- Output displays on electronic fault scanner (reference codes)
- Output displays on wheel alignment equipment.



Read tables, graphs and lists

- List of vehicles booked for work each day (list may be on whiteboard, paper, or computer screen)
- Parts pricelist
- Parts invoice and packing slip
- Parts catalogues
- Specification tables and graphs included in vehicle manuals or service information
- Supplier information sheets.

Read forms on job

- Job sheets
- Service or Maintenance schedule checklists
- Warrant of Fitness (WoF) or Certificate of Fitness (CoF) checklists
- Quality control checklists.

Read notices and memos

- Health and Safety information
- First aid information
- Notices on the notice board
- Company Code of Conduct or policies, processes, and procedures
- Supplier updates
- Vehicle Inspection Requirements Manual (VIRM) updates.

Read diagrams

- Look at illustrations in manuals to identify vehicle parts and components
- Interpret assembly drawings in service and parts manuals
- Interpret wiring diagrams
- Interpret exploded parts diagrams in service and parts manuals.

Read industry publications or supplier publications

- Trade magazines
- Supplier promotional material
- Websites with news and information about vehicle models, new technology and updates.

Reading tasks

Read instructions and more detailed job information

Technicians who work on light vehicles use manuals and instructional documents. Many of these documents are complex and include different types of text – for example indexes, written descriptions, specifications, exploded parts diagrams and process instructions. They may be in paper form or accessed using a computer. Technicians use the documents that are related to their range of work and their specialist expertise.

For example:

Service and simple repairs technician

- Part installation instructions
- Vehicle servicing instructions.

Service and more complex repairs technician

- Vehicle service manual (make and model)
- Vehicle Inspection Requirements Manual (VIRM) for Warrant of Fitness (if workplace does WoF inspections)
- Bulletins from manufacturers with suggestions for diagnosing malfunctions
- Special instructions for how to complete repairs provided by automotive manufacturers.

Brake and clutch specialist

- Brake and clutch manuals.

Exhaust system specialist

- Exhaust and muffler manuals or catalogues (for example decibel or emissions ratings)
- Special instructions from customers regarding exhaust upgrades or custom designs to suit their needs.

Read training materials

- Apprenticeship training materials such as study guides, open and/or closed book assessments, practical assessments, CDX (paper and computer based)
- MITO Training Folder
- Supplier training handouts
- PowerPoint presentations
- Franchise learning materials (usually on-line).

Read employment related material

- Job descriptions
- Employment agreement or contract
- Company induction material
- Company forms (accident forms)
- Training agreement
- Health and safety manual.

Reading underpinning tasks and skills

Interpret graphic symbols.
- Signs
- Colour coding.

Recognise the features of a range of texts.
- Signs
- Codes
- Forms
- Drawings
- Procedures
- Manuals.

Recognise number formats.
- Serial numbers
- Part numbers
- Vehicle registration numbers
- Phone numbers.

Match numbers or codes across different texts.

Understand common and industry vocabulary.

Understand common and industry abbreviations.

Find out the meaning of unfamiliar words or phrases.

Use manuals as a reference source.

Follow written instructions (which may include diagrams).

Use a guide to document contents.
- Index
- Table of contents
- Key
- Legend.

Identify the main points from a page of text.

Scan text or table or label to find specific piece of information.

Read text thoroughly.

Make inferences based on what written material does not say.

Understand information in graphic material.
- Tables
- Graphs
- Diagrams
- Charts.

Interpret material read.
- Summarise material read in own words
- Take notes from material read
- Report accurately on the information read.

Writing tasks

Write short notes

- Write customer name and vehicle registration in job booking diary, on job booking whiteboard, or enter data into computer
- Write dates on service and WoF stickers
- Write notes to explain further work that should be done
- List parts needed or used
- Write notes to other technicians about work that has been done (paticularly when specialist work completed).

Complete workplace forms

- Time sheets and leave forms
- Job sheets, including details of parts used, other materials used
- Service checklist
- WoF checklist
- Repair checklist
- Job sheets are often completed using computer software (i.e. not handwritten). In these situations technicians must enter information using the keyboard, and select correct codes from drop down menus to add the required text to the job sheet.

Write more detailed descriptions

- Write a detailed description of the work carried out on the customer's vehicles so they will understand how any faults were diagnosed, what action was taken and why.

Create drawings, diagrams or sketches

- Sketch repairs completed to show technicians from other workshops what repairs were carried out (Specialists are more likely to perform this task).

Write for training purposes

- Record notes in MITO Practical Jobs Record Book
- Complete MITO Training Folder
  - including Practical Task Evidence Sheets
- Complete exercises in study guides
- Write answers to open book and closed book assessment questions.

Writing underpinning tasks and skills

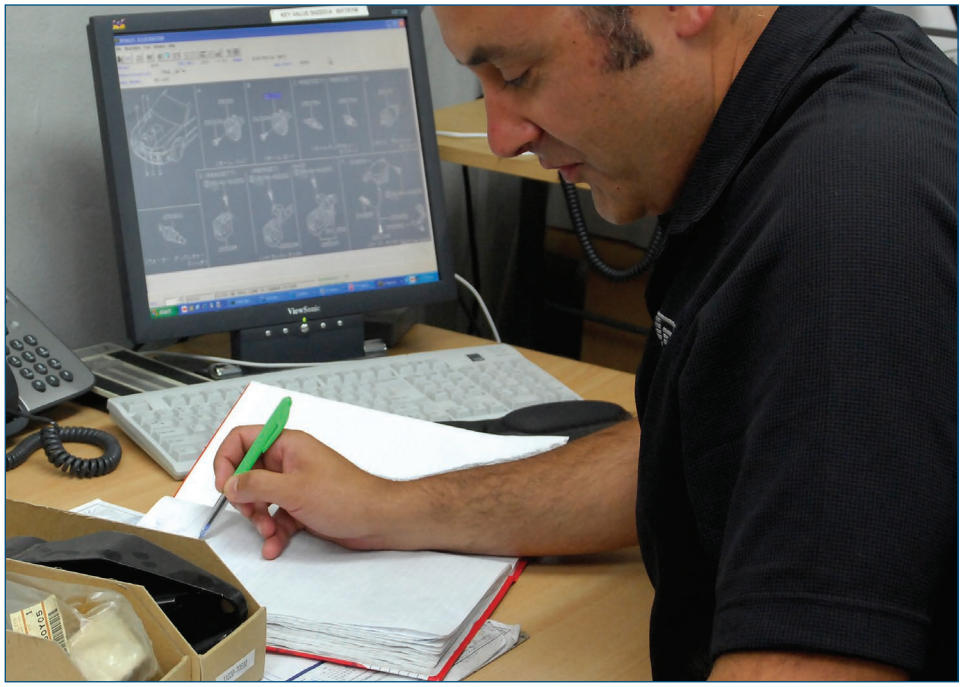
Understand that different writing styles are used for different types of writing.
- Note
- List
- Checklist
- Form
- Study guide activities
- Open and closed book assessment answers.

Complete forms using numbers, single words, or short sentences.
- Handwriting must be legible
- Abbreviations can be used
- Spelling must be understandable, but correct spelling is not essential
- Grammar and punctuation must be understandable.

Write paragraphs (narrative descriptions of work).
- Handwriting must be legible
- Use recognisable spelling
- Write points in a logical order
- Use descriptive text to outline a sequence of activities
- Use punctuation
- Attempt to use correct tenses, and correct verb and subject agreement.

Take notes from training material (during their apprenticeship).

Write short answers to assessment questions (during their apprenticeship).
- Handwriting must be legible
- Abbreviations can be used
- Spelling must be understandable, but correct spelling is not essential
- Grammar and punctuation must be understandable.



Speaking and listening tasks

Speaking and listening includes non-verbal communication

Listening

- Listen to oral instructions from workshop supervisor or manager
- Listen and respond to requests from colleagues
- Listen to explanations and on-job training
- Listen during health and safety meetings and briefings.

Speaking

- Ask questions to ensure you have understood what another person said
- Ask for assistance when needed (e.g. ask for guidance to carry out complex jobs)
- Report work progress to supervisor or manager (e.g. inform them when a job is going to take longer than expected)
- Report issues or potential hazards to supervisor or manager.

Interactive speaking and listening

- Communicate with colleagues (teamwork) during day to day work situations
- Communicate in noisy environments using hand signals and gestures
- Request parts by asking office staff to order, or by contacting supplier directly
- Participate in team meetings (contribute ideas, listen attentively)
- Answer oral questions during unit standard assessments
- Discuss apprenticeship progress with MITO Industry Training Advisor
- Make suggestions to help other colleagues diagnose a fault.

Interactive speaking and listening - customer contact

- Interact in a professional and friendly manner with customers when dropping off and picking up their vehicles
- Communicate with a wide range of customers in appropriate ways
- Discuss progress of job with customer
- Ask customer for permission to complete additional work on vehicle
- Explain what work has been completed on vehicle
- Listen to customer's description of fault with vehicle
- Ask customer questions to assist with identifying problems or faults.

In some workplaces, apprentices and technicians do not speak to customers about the details of a vehicle service or repair. The foreman or a senior technician will carry out this task. In these workplaces, customer contact will usually be limited to polite conversation when vehicles are picked up or dropped off.

In other workplaces, the person who is working on a vehicle is expected to take full responsibility for communicating with the customer. In this type of environment, apprentices and technicians will need higher levels of speaking and listening skills to communicate effectively with customers.

More experienced and specialist technicians are more likely to make suggestions to help other colleagues diagnose a fault.

Speaking and listening underpinning tasks and skills

Speak clearly.

Discuss topics which are appropriate in work context.

Use words, pronunciation, and tone appropriate to situation and audience.

Plan the main points to cover in a conversation.

Open and close conversations appropriately.

Give information in a sensible order.

Understand that communication is a two way process.

Use active listening skills.
- Repeat message back to sender
- Summarise instructions in own words
- Use following techniques e.g. say "aha" or "okay" to follow what someone is saying.

Present and defend a viewpoint.

Read information out loud.

Use hand signals and gestures to communicate in noisy environment.

Use open and closed questions to gain information, check understanding and encourage further discussion.

Use closed questions to check the person agrees with what you have asked.

Summarise to check or clarify details.

Use suitable body language.

Read body language of person speaking, or being spoken to, and respond appropriately.

Understand that there are barriers to communication, especially in cross-cultural situations.

Use assertive communication techniques.

Numeracy tasks

Estimation

Money

- Estimate price of job for quoting
- Estimate total price of work (e.g. to check all items are logged in the computer).

Time

- Estimate the amount of time it will take to complete a job
- Estimate time a part (e.g. faulty brake or clutch) or vehicle will need to be in the workshop
- Estimate date of next servicing (taking into account life of products used in the repair and signs that some parts such as worn brake shoes need to be replaced soon)
- Estimate time a vehicle will need to be in the workshop to complete the work.

Exhaust system specialist

- Estimate the length of pipe needed to fabricate an exhaust system component before bending or cutting.

Calculation

Money

- Calculate total price of work completed
- Take payment
- Give correct change.

Managing parts

- Count and tally number of parts if more than one.

Measurement

- Calculate difference between current measurement and required measurement.

Brake and clutch specialist

- Calculate amount that needs to be removed from a brake drum or rotor
- Calculate if amount removed from brake drum or rotor is within minimum tolerance
- Check brake pressure is within acceptable range either when diagnosing for faults or once repairs are completed (measured in kPa)
- Calculate the length of brake tube to make up brake pipes including allowing for bends.

Exhaust system specialist

- Calculate the length of pipe to use, taking into account length lost on bends and curves
- Calculate the angles to bend the pipe to fit the vehicle's under body.

Measurement, shape and space

Time

- Monitor amount of time spent on a job
- Accurately record the time taken to complete a job (may involve fractions of an hour)
- Work out date for next servicing.

Matching sizes

- Use parts, fastenings and tools that are the correct size for the job.

Convert between metric and imperial

- Convert imperial measurements to metric measurements and vice versa
- Convert tool sizes in imperial to metric and vice versa.

Shapes and transformations

- Interpret vehicle engine and part diagrams.

Location

- Use directions and maps to find locations for pick-up and drop-offs.

General service and repair technician

- Measure and record tyre pressure, oil pressure, water temperature, odometer, depth of tyre tread, thickness of brake linings and RPM
- Use measuring devices that have analog or digital displays
- Use a torque wrench to tighten bolts to correct torque setting
- Measure amount of oil and other fluids used e.g. brake fluid, coolant ratio
- Use vernier callipers, micrometers, and feeler gauges, to measure sizes and clearances.

Brake and clutch specialist

- Measure rotor thickness within two decimal places (e.g. measuring 0.25mm)
- Measure the thickness of brake drums using callipers (measure in millimetres)
- Recognise common angles (e.g. 15, 30, 45 and 90 degrees for measuring rotor run-out)
- Machine a surface of a fly-wheel so it is visibly flat
- Measure run out, convert between imperial measurements such as 0.010" and its equivalent metric measurement 0.25mm
- Measure brake rotor thickness with a micrometer in metric and then machine the rotor using imperial units
- Measure foot pedal height in millimetres.

Exhaust system specialist

- Measure the width and depth of the muffler to ensure it will fit within the designated space
- Measure the thickness of the pipe before cutting to ensure it is not too big for the space available on the vehicle
- Measure the length of the overall exhaust system taking into account all parts in order to ensure the exhaust system will fit
- Recognise common angles (e.g.15, 30, 45 and 90 degrees for measuring bends in the pipe)
- Check the decibel level is acceptable on loud exhausts with a decibel reader measured in Db (decibels)
- Sketch the shape of pipes and mufflers.

Numeracy underpinning tasks and skills

Recognise numbers as part of a code.

Use numbers in different forms.
- Whole numbers
- Decimals
- Fractions
- Percentages
- Ratios
- Negative numbers.

Do number problems.
- Addition
- Subtraction
- Multiplication
- Division.

Understand difference between imperial and metric measurements.

Convert from metric to imperial and back.

Understand place value.

Estimate quantities.
- Length
- Time
- Number.

Measure accurately.
- Length
- Time
- Number
- Temperature
- Pressure
- Volume
- Capacity
- Angle.

Use 12 or 24 hour clock.

Interpret numerical information represented on:
- Graphs
- Tables
- Scales
- Dials
- Gauges.

Critical thinking tasks

Critical thinking relates to how we use knowledge and experience to make decisions about what we will do.

Common to most technicians working on light vehicles

- Decide which task to do first on a job, and the best order to complete the other tasks within that job
- Identify any other things that need to be repaired that are not on the job sheet
- Get workshop supervisor's approval before completing work not listed on the job sheet
- Ask for help when needed
- Compare parts from different suppliers and select correct substitute part
- Deal with problems e.g. oil spill in workshop, personal injury
- Decide what to do when carrying out routine maintenance and find that additional repairs need to be made (e.g. decide how to reschedule other jobs waiting, whether to pass the job on to someone else).

Less experienced technicians may work alone on straightforward servicing and minor repair jobs. They will refer to experienced technicians regularly and may work alongside more senior technicians on complex jobs. As an apprentice technician becomes more experienced, he or she may carry out work that requires more diagnostic exploration.

When carrying out more complex repairs

- Generate a list of possible reasons for a vehicle fault
  - Recall similar issues or problems from past experience to help with fault diagnosis and repair
  - Use significant knowledge of how vehicle systems operate to help with fault diagnosis and repair
- Identify possible solutions
- Select and implement a solution
- Check that the solution is acceptable to the customer
- Decide what order to take action to get the job done
- Check that the solution has worked
- Check that the work meets safety and quality standards
- Decide what to do if a problem persists (recall similar issues they have dealt with before)
- Decide what to do if the part required for the repair isn't available (have to decide whether to wait, find a second hand part or make the part)
- Decide if a problem is outside of the scope of diagnostic equipment in the workshop (have to decide how to diagnose fault and what the next step will be).

Brake and clutch specialist

- Continually assess if their work is to the highest safety standards (e.g. is the brake rotor below minimum thickness after machining?)
- Continually assess if their work meets quality assurance standards (e.g. cleaning surfaces of brake rotors)
- Decide when brake components will be cool enough to handle.

Exhaust systems specialist

- Determine the durability of their work (e.g. is the welding going to be strong enough to hold up under normal wear and tear)
- Decide if work carried out is within quality assurance standards (e.g. cleaning surfaces of a flange before attaching the flange to the engine)
- Evaluate if there will be enough gas in a gas welder to complete a weld, before starting the weld
- Decide when metal will be cool enough to handle following welding.

Critical thinking underpinning tasks and skills

Use problem solving methodology e.g.
- identify issue
- identify possible solutions
- determine best outcome
- decide on plan of action
- carry out plan.

Develop knowledge of common and unusual faults and the solutions used to correct them.

Apply knowledge of professional trade practice to work carried out.

Apply knowledge of safety requirements and principles to work practice.

Apply knowledge of quality assurance processes to work carried out.

Identify when personal knowledge and skills are sufficient to work on own.

Identify when personal knowledge and skills are not sufficient and know who to ask for help.

Recall and follow specified procedures to deal with problems.

Information and Communication Technology tasks

Many automotive technicians

- Interpret the display of electronic vehicle scanning tools
- Use computer-based diagnostic programmes
- Consult electronic vehicle manuals and reference material (CD ROM based or web based)
- Use the NZ Transport Agency web based system (LANDATA) to record WoF results
- Record and update customer details on company computer system
- Create job sheets using the computer system
- Update job sheets and job records using the computer system.

Some automotive technicians

- Produce invoices using the computer system
- Look up parts information on supplier websites
- Place orders via supplier websites
- Access and use computer based training modules
- Use computer based equipment such as wheel alignment machines.

Information and Communication Technology underpinning tasks and skills

Operate a computer or digital device.
- Start the computer or device
- Log-in if needed
- Start appropriate application
- Exit appropriate application
- Turn off computer or device.

Identify elements of computer applications and the function of the element (e.g. menus and menu options, command buttons, icons, toolbars).

Identify appropriate computer application for task (e.g. spreadsheet, word processor, e-mail, web browser, drawing, company software system).

Develop knowledge of how to use computer applications (e.g. navigation, shortcuts, correct way to enter data, updating records, recovering information).

Operate computer application(s).

Enter or update data using keyboard, mouse or other input device.

Link to Learning Progressions for Adult Literacy and Numeracy

The Tertiary Education Commission has developed the Adult Learning Progressions. They provide a framework and language for describing literacy and numeracy skills and knowledge. There are strands for Reading, Writing, Speaking, Listening and Numeracy. Each strand is divided into progressions and there are six steps (step 1 is lower and step 6 is higher). There are assessment tools that measure what step a person is on at the different strands.

We can use the Adult Learning Progressions to help us understand how to build the literacy and numeracy skills and knowledge that apprentices and technicians need.

The information here explains how the tasks described in this profile relate to the Adult Learning Progressions.

Read with Understanding:

All apprentices working on light vehicles will read a small range of on-job forms, signs, job sheets, and short instructions early in their apprenticeship. These tasks map to step 2 on the Read with Understanding strands.

Apprentices need to quickly learn to read all the technical terms relating to vehicle servicing and repair. Most of the vocabulary used in automotive workshops maps to step 4 to 5 on the Decoding and Vocabulary progressions of the Read with Understanding strand. Specialist technicians (e.g. those with expertise in Brake and Clutch or Exhaust Systems) will use more specialist words than general technicians. Technicians who carry out WoF and CoF inspections will need a larger vocabulary (including academic and legal terms) and this maps to step 6 of the Vocabulary strand.

To use their MITO learning material, apprentices need to be able to locate, organise, summarise, compare and evaluate information from a range of texts. These skills map to step 4 and 5 on the Read with Understanding strand.

General service apprentices will need to quickly develop their reading skills so that they can achieve step 4 on the Read with Understanding strand.

Repair and specialist technicians use reference manuals and websites more frequently. The skills required to use this type of reference material map to step 4 and 5 on the Read with Understanding strand. Apprentices learning to repair or carry out specialist tasks on vehicles would benefit from being at step 5 on the Read with Understanding strand.

Write to Communicate:

All apprentices working on light vehicles complete mostly simple writing tasks, as do qualified technicians. Examples include filling in details of work completed on job sheets, and marking checklists. Most writing is one word or short sentences, and little punctuation is required. These tasks map to step 1 and 2 on many of the progressions in the Write to Communicate strand.

Apprentices need to be able to spell and write specialist terms relating to light vehicle service and repair. The specialist vocabulary used in these trades maps to step 4 on the Spelling and Vocabulary progressions of the Write to Communicate strand.

As part of their training, all apprentices must take notes to remember what they have learned, write answers to assessment questions, and complete their MITO practical task records. These tasks map to step 3 and 4 on the Write to Communicate strand.

General service apprentices will need to develop their writing skills so they can achieve step 3 to 4 on the Write to Communicate strand.

Repair and specialist technicians may have to write more detailed explanations of the work they have completed on a vehicle. The skills required to do this more complex writing work map to step 3 and 4 on the Write to Communicate strand. Apprentices learning to repair or carry out specialist tasks on vehicles would benefit from being at step 4 on the Write to Communicate strand.

Speak to Communicate and Listen with Understanding:

All technicians and apprentices working on light vehicles use their speaking and listening skills all the time during their working day. At the beginning of their apprenticeship, apprentices take part in simpler conversations, using words they already know, with colleagues and supervisors. These tasks map to step 3 on the Listen with Understanding strand, and step 2 to 3 on the Speak to Communicate strand.

Apprentices must have strategies to help when comprehension breaks down, as this will help them understand detailed instructions and explanations from their on-job trainers.

As apprentices gain experience, they will speak to customers more frequently.

All apprentices need to quickly develop their speaking and listening skills to be at least at step 4 on the Listen with Understanding and Speak to Communicate strands. They will also need to get to step 4 to 5 on the Listen with Understanding Vocabulary progression, as they will be exposed to specialist automotive industry words every day.

Numeracy Progression Strands:

All technicians and apprentices working on light vehicles carry out tasks (e.g. taking a range of measurements from vehicle systems, recording time, calculating price of jobs) that require them to be at step 5 to 6 on the Make Sense of Number to Solve Problems, and Measure and Interpret Shape and Space strands. They also need to be accurate when totalling up bills and may be called on to take payments from customers.

Apprentices' numeracy skills and knowledge will need to be at least at step 5 when they start their apprenticeship, or developed soon after.

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