Government of **Western Australia**
School Curriculum and Standards Authority

SAMPLE ASSESSMENT TASKS

AUTOMOTIVE ENGINEERING AND TECHNOLOGY
GENERAL YEAR 12

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Sample assessment task

Automotive Engineering and Technology – General Year 12

Task 1 – Unit 3

Assessment type: Response

Conditions
Period allowed for completion of the task: three weeks

Task weighting
5% of the school mark for this pair of units

Automotive mechanics – safety **(15 marks)**
Apply safety data information and workshop Occupational Safety and Health (OSH) regulations to both individuals and small groups
Complete workshop safety activities

What you need to do
A journal of activities is to be completed during practical sessions
Complete the following steps:

1. watch safety video http://smartmove.safetyline.wa.gov.au/
   - complete general and automotive modules for a SmartMove certificate (10 marks)
     http://smartmove.safetyline.wa.gov.au/course/view.php?id=2
2. after instruction, choose an automotive workshop machine
   - describe and demonstrate the correct steps in operating the machine, explaining the Occupational Safety and Health requirements (5 marks)

Continue to practise general safety aspects around the workshop

What needs to be submitted	Date due
☐ General and automotive modules for a SmartMove certificate	
☐ Workshop machine demonstration and explanation	

Marking key for sample assessment task 1 – Unit 3

WorkSafe SmartMove certificates and appropriate behaviour	Maximum possible mark	Allocated mark
View video and complete general module • independently viewed the video, attempted and completed the quiz, received a certificate • attempted several times and completed the quiz, received a certificate • attempted several times, but did not receive an OSH certificate	4–5 2–3 0–1	/ 5
Completed automotive module and certificate • independently attempted and completed the quiz, received a certificate • with assistance, attempted several times and completed the quiz, received a certificate • attempted several times, but did not receive a certificate	4–5 2–3 0–1	/ 5
Demonstration of selected workshop machine, description of operation and OSH requirements • correct demonstration of operational steps, with clear explanation of process, and safety and OSH issues explained • operational steps demonstrated, expressing general OSH issues • little understanding of the operation of the machine, limited awareness of OSH issues and safety	4–5 2–3 0–1	/ 5
	Total	**/ 15**

Sample assessment task

Automotive Engineering and Technology – General Year 12

Task 2 – Unit 3

Assessment type: Response

Conditions
Period allowed for completion of the task: three weeks

Task weighting
5% of the school mark for this pair of units

Scientific principles – chemical and mechanical energy, energy conversion
Fuels and lubricants, their association with different engines and automotive technologies
Performance of different types of fuels in various types of engines

What you need to do

1. Present a report using a series of notes in dot points **(30 marks)**
   For each of the following fuels and lubricants:
   - give an example of the form of engine or transportation system each fuel is used in
   - state the advantages and disadvantages of using each fuel
   - explain the fuel/air mixing and combustion principles relevant to each fuel

   Fuels
   - leaded petrol
   - unleaded petrol
   - diesel
   - liquid petroleum gas (LGP)
   - kerosene

   Lubricants
   - engine oils
   - transmission and power steering fluids
   - gearbox and differential oils
   - brake fluids
   - engine coolants

2. Present a report using a series of notes in dot points **(50 marks)**
   For each lubricant above:
   a) state where it is used and whether it is used to either:
      - reduce friction
      - provide a non-compressible fluid for the transmission of force, or
      - protect a system against heat and corrosion

   Explain
   b) how it is checked and refilled
   c) how often it needs replacing
   d) how to safely store this lubricant
   e) how to safely dispose of this lubricant

What needs to be submitted	Date due
☐ Report on fuels	
☐ Report on lubricants	

Marking key for sample assessment task 2 – Unit 3

Report on Fuels	Maximum possible mark	Mark allocation
Leaded petrol		**/6**
• example of the form of engine or transportation system each fuel is used in	1–2	
• the advantages and disadvantages of using each fuel	1–2	
• explanation of the fuel/air mixing and combustion principles	1–2	
Unleaded petrol		**/6**
• example of the form of engine or transportation system each fuel is used in	1–2	
• the advantages and disadvantages of using each fuel	1–2	
• explanation of the fuel/air mixing and combustion principles	1–2	
Diesel		**/6**
• example of the form of engine or transportation system each fuel is used in	1–2	
• the advantages and disadvantages of using each fuel	1–2	
• explanation of the fuel/air mixing and combustion principles	1–2	
LPG		**/6**
• example of the form of engine or transportation system each fuel is used in	1–2	
• the advantages and disadvantages of using each fuel	1–2	
• explanation of the fuel/air mixing and combustion principles	1–2	
Kerosene		**/6**
• example of the form of engine or transportation system each fuel is used in	1–2	
• the advantages and disadvantages of using each fuel	1–2	
• explanation of the fuel/air mixing and combustion principles	1–2	
	Total	**/30**

Marking key for sample assessment task 2 – Unit 3

Report on Lubricants	Maximum possible mark	Mark allocation
Engine oils		**/10**
• correct statement as to where it is used and what it does	1–2	
• correct explanation of how it is checked and refilled	1–2	
• correct explanation of how often it needs replacing	1–2	
• correct explanation of the safe storage of this lubricant	1–2	
• correct explanation of the safe disposal of this lubricant	1–2	
Transmission and power steering fluids		**/10**
• correct statement as to where it is used and what it does	1–2	
• correct explanation of how it is checked and refilled	1–2	
• correct explanation of how often it needs replacing	1–2	
• correct explanation of the safe storage of this lubricant	1–2	
• correct explanation of the safe disposal of this lubricant	1–2	
Gearbox and differential oils		**/10**
• correct statement as to where it is used and what it does	1–2	
• correct explanation of how it is checked and refilled	1–2	
• correct explanation of how often it needs replacing	1–2	
• correct explanation of the safe storage of this lubricant	1–2	
• correct explanation of the safe disposal of this lubricant	1–2	
Brake fluids		**/10**
• correct statement as to where it is used and what it does	1–2	
• correct explanation of how it is checked and refilled	1–2	
• correct explanation of how often it needs replacing	1–2	
• correct explanation of the safe storage of this lubricant	1–2	
• correct explanation of the safe disposal of this lubricant	1–2	
Engine coolants		**/10**
• correct statement as to where it is used and what it does	1–2	
• correct explanation of how it is checked and refilled	1–2	
• correct explanation of how often it needs replacing	1–2	
• correct explanation of the safe storage of this lubricant	1–2	
• correct explanation of the safe disposal of this lubricant	1–2	
	Total	**/50**

Sample assessment task

Automotive Engineering and Technology – General Year 12

Task 3 – Unit 3

Assessment type: Production and assembly

Conditions
Period allowed for completion of this task: three weeks

Task weighting
15% of the school mark for this pair of units

Under-vehicle activities
Complete the following activities and record the practical skills learnt in a journal or on a worksheet
Perform all Occupational Health and Safety (OSH) requirements while in the workshop **(6 marks)**

Part A: Chassis, under-vehicle and suspension component inspection **(14 marks)**
Complete an under-vehicle inspection of front and rear chassis and suspension set ups

Part B: Lubrication of parts **(10 marks)**
Complete the process to lubricate, where necessary, the components of the steering and drive systems

Part C: Removal and replacement of shock absorber and strut **(20 marks)**
Complete a procedure to remove and replace a rear shock absorber and strut

What you need to do
A journal of activities to be completed during practical sessions:

- select and use the correct workshop worksheet
- follow the recommended procedure on the worksheet
- follow correct OSH workshop practices
- use correct tools and equipment
- record your observations and skills learnt

Part A: Chassis, under-vehicle and suspension component inspection
Complete the activity, using a specific process according to the correct worksheet:

- ask your teacher to organise the vehicle and observe you lifting the vehicle on a hoist
- check all the under-vehicle rubber components for wear, damage or missing pieces, and record your observations
- check wear and condition of all joints and components, and record your observations
- check chassis, condition of under body and suspension, drive and steering system components, brake lines and/or cables, exhaust system and record your observations

Part B: Lubrication of steering and drive components

With the vehicle safely lifted on the hoist, use a specific process according to the correct worksheet:

- locate all joint grease points and clean with a suitable cloth
  - the vehicle steering system and tail shafts may need to be rotated to gain access to all lubrication points
  - indicate to your teacher all points found and cleaned
- fill each joint until an overflow of grease is just detected
- before cleaning any excess grease away, allow your teacher to check your work
- record observations and your skills learnt

Part C: Removal and replacement of a rear shock absorber and strut

With the vehicle safely lifted on the hoist, use a specific process according to the correct worksheet:

- ensure both front wheels are chocked front and back
- lift one rear wheel only, 25mm up off the hoist with a hydraulic jack
  - block the vehicle with axle stands under the car lifting point or rear axle
  - ask your teacher to check your work at this stage
- remove the rear wheel
- remove the shock absorber and/or strut
  - spring pressure on the strut is very dangerous – DO NOT REMOVE CENTRE NUT OF THE STRUT
- show your teacher the shock absorber or strut prior to replacement
- complete the fitting process and ask your teacher to check your work
- lower the vehicle onto the hoist
- remove chocks
- clean and store all tools and chocks
- record your observations and skills learnt

What needs to be submitted	Date due
☐ Part A: Chassis and suspension component inspection	
☐ Part B: Lubrication of parts	
☐ Part C: Removal and replacement of shock absorber and strut	

Marking key for sample assessment task 3 – Unit 3

Under-vehicle activities	Maximum possible mark	Mark allocation
Part A: Chassis and suspension component inspection		
• correct lifting of vehicle on hoist	1–2	
• correct observation of any wear, damage or missing pieces	1–2	
• clear and complete recording of observations	1–2	
• correct process followed to inspect for wear or damage to any joints or components	1–2	
• clear and complete recording of observations	1–2	
• correct check of all chassis and under-vehicle suspension, drive and steering system components	1–2	
• clear and complete recording of observations	1–2	
		/14
Part B: Lubrication of parts		
• all joint grease points located and cleaned correctly	1–2	
• all joint grease points lubricated to correct amount	1–2	
• all joint grease points wiped down cleanly	1–2	
• all tools used responsibly, and correct disposal of waste materials	1–2	
• clear and complete recording of observations and skills learnt	1–2	
		/10
Part C: Removal and replacement of shock absorber and strut		
• correct chocking of vehicle	1–2	
• correct lifting, supporting vehicle and removal of wheel	1–2	
• correct and safe removal of shock absorber and strut	1–2	
• correct and safe replacement and fitting of shock absorber and strut	1–2	
• correct check of reassembled suspension components	1–2	
• correct removal of vehicle from hoist	1–2	
• correct use of tools	1–2	
• correct use of equipment	1–2	
• responsible adjustment/maintenance/replacement of tools and equipment	1–2	
• complete journal or worksheet entries	1–2	
		/20
Occupational safety and health		
• correct OSH/workshop practices followed	1	
• responsible safe behaviour in the workshop	1	
• awareness of safety for others in workshop	1	
• correct clothing, footwear, safety glasses worn	1	
• correct manual handling of tools and equipment	1	
• correct waste disposal and clean-up of workshop	1	
		/6
Total from all activities		**/50**

Sample assessment task

Automotive Engineering and Technology – General Year 12

Task 4 Part A – Unit 3

Assessment type: Investigation and diagnostics

Conditions
Period allowed for completion of the task: two weeks

Task weighting
5% of the school mark for this pair of units

Design brief
Use the design process to design a tool or device to be used during automotive workshop activities
(44 marks)

What you need to do
Develop design process notes for a product, including all of the following steps:

1. prepare cover page and statement of problem and intent including: function, aesthetics, safety, cost considerations (3 marks)
2. investigate (using available research resources) and present a collection of notes and images that show:
   - personal design needs
   - limitations
     - list of available materials and equipment
   - existing, and similar design ideas
     - tools and devices around the workshop
     - tools and devices outside the workshop
     - tools or devices that satisfy your personal design needs
     - include your sources of information
   - structural and workability properties of available suitable materials (8 marks)
3. choose materials based on the relationship of material properties to design, function, cost and safety, then identify the different available finishes; select and explain the need for a finish (3 marks)
4. devise and develop concept design sketches incorporating the elements of design:
   - adapt design ideas using annotated graphics and sketches (8 marks)
5. present an annotated, rendered sketch of final solution, including any likely applied finish (6 marks)
6. create simple working drawing/s or develop a template or make a pattern:
   - showing all measurements
   - selecting and showing methods of joining (6 marks)
7. select and list materials and calculate simple cutting/costing list/s (6 marks)
8. produce a basic plan and timeline for production (4 marks)

What needs to be submitted for assessment	Due date
☐ Cover page and statement of problem and intent	
☐ Research on existing ideas/concepts	
☐ Choice of materials/parts list, finishes	
☐ Annotated concept sketches showing concept development	
☐ Final sketch of proposed solution	
☐ Working drawings or template or pattern for product	
☐ Materials/parts list, costing and order form	
☐ Work schedule/proposed production plan	

Marking key for sample assessment task 4 Part A – Unit 3

Design brief for workshop tool or device	Maximum possible mark	Allocated mark
1. Provides a cover sheet and a statement defining a need or purpose for the product:		
• clear statements about function, aesthetics, safety, cost considerations	3	
• general statements about the likes and dislikes	2	
• broad areas of the design problem in limited general terms only	1	**/3**
2. Provides information about existing tools and devices:		
• number of carefully selected different examples and images, with source referencing, using the design considerations to make detailed comparisons	7–8	
• comparisons between a number of carefully selected different examples and images against the design considerations	5–6	
• number of different examples with notes describing the differences	3–4	
• selection of ideas of a single example with limited annotation about likes and dislikes	1–2	**/8**
3. Identifies and chooses materials and finish based on the relationship of material properties to design, function, cost and safety:		
• selection of materials and finish based on function, aesthetics, safety, cost considerations	3	
• includes general statements about materials and finishes	2	
• limited reference to materials and design fundamentals	1	**/3**
4. Complete sketches of possible shapes, joins, specific features, likely dimensions and notes on likely finishes :		
• detailed, well-proportioned sketches that show progression from concept ideas to specific ideas; parts, showing relevant joining methods with appropriate specific dimensions; likely combinations of materials and finishes	7–8	
• well shaped sketches that show concept ideas, including other materials, joining and appropriate overall dimensions	5–6	
• sketches that show development of mainly a single concept idea, some materials and joining, some dimensioning	3–4	
• collection of dissimilar sketches, limited design progression with few notes	1–2	**/8**
5. Presents final, annotated, rendered sketch of proposed solution showing any relevant likely finish:		
• well-drawn, correctly proportioned, three-dimensional, colour-rendered representation of the proposed product, reflecting clear development from the concept stage	5–6	
• well-drawn representation of solution	3–4	
• representation of solution, but with minor errors or missing detail	1–2	**/6**
6. Presents working drawing/s or template or selected pattern:		
• well-drawn, correctly labelled view/s with clear accurate dimensioning	5–6	
• well-drawn views with correct major dimensions	3–4	
• views with majority of correct dimensions, but with minor errors	1–2	**/6**
7. Completed list of materials and order form, plus any additional parts:		
• clear list of materials and parts with correct sizes, costing completed	5–6	
• list of materials with approximate sizes and calculated approximate cost	3–4	
• incomplete list of parts	1–2	**/6**
8. Proposed steps for production:		
• correct procedures listed indicating available tools for making the product	3–4	
• partial list of procedures and tools	1–2	**/4**
	Total	**/44**

Sample assessment task

Automotive Engineering and Technology – General Year 12

Task 4 Part B – Unit 3

Assessment type: Production and assembly

Conditions
Period allowed for completion of the task: five weeks

Task weighting
15% of the school mark for this pair of units

Produce the proposed tool or device
Apply safe production methods to manage the production of the product **(25 marks)**

What you need to document and include in your daily work log/time sheet

- complete an ongoing record of production with photos at each stage of production, including photographs of completed working product

Use the following procedures to complete the product

- follow proposed production plan
- maintain time management while using tools, equipment and machinery to complete production
  - follow instructions from plans
  - maintain safety requirements
  - record any changes to materials or design
- complete marking out of material/s as required from plan and cut parts to required sizes using appropriate tools (5 marks)
- carefully shape and assemble/fix/join parts together (12 marks)
- use photography to record ongoing progress, record reasons for any changes made to the product (8 marks)

What needs to be submitted for assessment	Due date
☐ Stages of production (teacher observation)	
☐ Completed working product	

Marking key for sample assessment task 4 Part B – Unit 3

Production of proposed product	Maximum possible mark	Allocated mark
Completed marking out of material/s as required from plan and cut parts to required sizes, using appropriate tools: • marking out completed correctly, all parts correct size and square • marking out completed, parts correct size • marking out completed with minor corrections, parts correct size • marking out required correction, adjusted parts re-sized • marking out required correction, replacement piece cut	 5 4 3 2 1	 **/5**
Completed shaped, assembly/fitting of product parts: • all parts and joints accurately assembled to size and shape, even and square fit • all parts and joints assembled, even and square fit, minor blemishes in surfaces • all parts and joints assembled, minor corrected unevenness • all parts and joints assembled, minor shape unevenness • all parts and joints assembled, but some required second attempt, some poor fit • parts fitted, joints show poor fit, and some require additional material for second attempt	 11–12 9–10 7–8 5–6 3–4 1–2	 **/12**
Completed product and ongoing record of production: • correctly assembled/fitted product, presented as per design proposal; detailed record of production, clearly showing each stage of the process • correctly assembled/fitted product, easily identified from the design proposal; well explained stages of the process in the record of production • completed product, appearance shows minor detail flaws; limited record of production • assembled, but poorly fitting parts, appearance and production notes show a deviation from the design and production plan	 7–8 5–6 3–4 1–2	 **/8**
	Total	**/25**

Sample assessment task

Automotive Engineering and Technology – General Year 12

Task 4 Part C – Unit 3

Assessment type: Response

Conditions
Period allowed for completion of the task: one week

Task weighting
5% of the school mark for this pair of units

Evaluation of completed working product
Test and evaluate finished product by responding to evaluation questions

What you need to do
Write clear statements to evaluate the product

Comment on the following key points, using relevant or all minor dot points:

- Did the product meet the design requirements? **(10 marks)**
  - compare product against design ideas and final drawings
  - comment on aesthetics, appearance, function and safety
    - shape and size
    - finish
    - cost
    - safe usage
- Did the manufacturing processes achieve a quality product? **(5 marks)**
  - comment on success of manufacturing skills
    - correct shape and size as per design
    - proportion and fit
    - accurate joins, no gaps
    - manufacturing influences on appearance
  - comment on ability to keep to the production procedure
- Could the shape, size and design features of the product be improved? **(5 marks)**
  - comment on aesthetics, function, safety and cost
  - comment on feedback from the consumer

What needs to be submitted for assessment	Due date
☐ Completed working product with completed report	

Marking key for sample assessment task 4 Part C – Unit 3

Evaluation of completed working product with completed report	Maximum possible mark	Allocated mark
Provides comments with regards to the specifications and design considerations of aesthetics, appearance, function and safety: • clear comments referring to specific design considerations combined with justification of design, fulfilling statement of intent requirements • comments outlining major uses and function, and referring to points within statement of intent • comments linked to statement of intent, expressing personal likes and dislikes about finished product • comments outlining use of product, but little reference to statement of intent • comments reflect superficial evaluation	9–10 7–8 5–6 3–4 1–2	**/10**
Provides comments on the manufacturing processes: • clear flow of evaluation of all procedures with reference to specific procedures, improvements with little or no critique of process • appropriate reporting and/or comment on procedures with some logical evaluation of operations, with little critique of process • comments on procedures with limited evaluation of operations, and some critique of process • brief comments with few references to journal or diary • comments reflect superficial evaluation	5 4 3 2 1	**/5**
Provides comments with regards to the shape and design features and improvements: • clear comments referring to aesthetics, function, safety and cost influenced by shape and size, and suggested improvements noted • comments suggesting improvements, referring to major design considerations • comments expressing personal likes and dislikes about improvements • brief reference to design changes to improve function or aesthetics • few comments/superficial notes on improvements	5 4 3 2 1	**/5**
	Total	**/20**