



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

SAMPLE ASSESSMENT TASKS

ENGINEERING STUDIES
ATAR YEAR 11

FOR TEACHING IN 2024

Acknowledgement of Country

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

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Sample assessment task

Engineering Studies – ATAR Year 11

Task 1 Part A– Unit 1

Assessment type: Design

Conditions

Period allowed for completion of the task: 2 weeks

Task weighting

5% of the school mark for this pair of units

Investigate the design topic and develop the first part of a design portfolio. (25 marks)

Develop the first part of a design folio for a product, with the following elements:

- research on design needs or opportunities and products with specific performance criteria, including
 - existing ideas and products, with supporting images
 - limitations
 - available materials and equipment
 - ways to supply energy
- a design brief, considering
 - a response to a problem, need or opportunity, given guidelines and context
 - function, aesthetics, safety, cost considerations and limitations
- ideas and concepts developed through chosen and annotated images, incorporating comments about design fundamentals and factors affecting design, with references back to the design brief
- references and sources of information.

What needs to be submitted for assessment	Due dates
<input type="checkbox"/> Research on design needs and products with specific performance criteria	
<input type="checkbox"/> Design brief	
<input type="checkbox"/> Annotated design concept images showing concept development	
<input type="checkbox"/> Listing of materials	
<input type="checkbox"/> References and sources of information	

Marking key for sample assessment task 1 Part A – Unit 1

Design folio – Investigation, design brief and concept development

Description	Mark
Provides information on a number of performance criteria and sources of inspiration with detailed comparisons, noting design considerations, supported by suitable images	7–8
Provides information on performance criteria and sources of inspiration with a number of examples and notes describing the differences	5–6
Provides information on a single performance criterion/inspiration, with some notation about likes/dislikes	3–4
Provides a few notes on performance criteria and sources of inspiration, with images that may not be suitable	1–2
Subtotal	/8
Provides information about an appropriate number of existing products, with source referencing, using the design considerations to make detailed comparisons	5
Provides information about an appropriate number of existing products, using the design considerations to make general comparisons	4
Provides information about some existing products with notes describing the differences	3
Provides information about a single existing product or a few products, with limited annotation about likes and dislikes	2
Provides information about existing product/s with a collection of dissimilar images and few notes	1
Subtotal	/5
Provides detailed information about the context and defines a need or purpose for the product that includes clear statements about function, aesthetics, safety, cost considerations and limitations	5–6
Provides information about the context and defines a need or purpose for the product that includes general statements about the pros and cons	3–4
Provides some information about the context and defines a need or purpose for the product that covers broad areas of the design problem in limited general terms	1–2
Subtotal	/6
Provides an appropriate number of ideas and concepts through chosen images, with annotations referring to design fundamentals, materials list and design brief, showing clear development of ideas and concepts	5–6
Provides some ideas and concepts through chosen images, with annotations referring to design factors, materials list and design brief, showing concept development	3–4
Provides a few ideas and concepts through a few chosen images, with simple annotations including list of materials, and little or some reference to ideas in the design brief	1–2
Subtotal	/6
Total	/25

Sample assessment task

Engineering Studies – ATAR Year 11

Task 2 Part A – Unit 1

Assessment type: Design

Conditions

Period allowed for completion of the task: 3 weeks

Task weighting

3% of the school mark for this pair of units

Research the definitions of energy, power and work. Define and compare forms of energy by providing common examples. (30 marks)

Instructions

- Research the definitions of energy, power and work, then produce a paragraph for each definition, with examples, and a final paragraph on the relationships between the three.
- Research sources of information to define and compare the different forms of energy. For each form of energy, identify and compare at least two (2) common examples or uses; the two examples should be described in approximately 100 words. Images may be included and referred to when comparing the forms of energy.
- List and provide a definition of the non-renewable and renewable sources of energy, as listed in Unit 1.
- Use lists to outline the advantages and disadvantages for society, the environment and industry of obtaining and using non-renewable and renewable sources of energy.
- Include all references in an appropriately set out reference list.

What needs to be submitted for assessment	Due dates
<input type="checkbox"/> Definitions and examples of energy, power and work	
<input type="checkbox"/> Comparison of the different forms of energy	
<input type="checkbox"/> Advantages and disadvantages for society, the environment and industry of obtaining and using non-renewable and renewable sources of energy	

Suggested references

Engineering fundamentals: an introduction to engineering. Moaveni, S. Toronto: Thomson, 2005.

Engineering mechanics: an introduction to statics, dynamics and strength of materials. Ivanoff, V. McGraw-Hill Higher Education, 1996.

Engineering studies: the definitive guide. Volume 1, the preliminary course. Copeland, P. L. Allawah, N.S.W.: Anno Domini, 2000.

Engineering studies: the definitive guide. Volume 2, the HSC course. Copeland, P. L. Allawah, N.S.W.: Anno Domini, 2001.

Marking key for sample assessment task 2A – Unit 1

Description	Mark
Documents definitions and relationships of energy, power and work with accurate detailed information and correct use of terminology	5–6
Documents definitions and relationships of energy, power and work with minor errors and mostly correct use of terminology	3–4
Documents definitions and relationships of energy, power and work to a limited degree, with some incorrect terminology and/or missing critical information	1–2
Subtotal	/6
Defines and compares forms of energy with clear, accurate definitions, giving two examples and/or uses of each form using appropriate terminology	9–10
Defines and compares forms of energy with satisfactory definitions, giving two examples and/or uses of each form using appropriate terminology	7–8
Defines and compares forms of energy using correct terminology but has minor errors in some descriptions of the examples	5–6
Defines and compares some forms of energy in general terms, with minor errors in some descriptions of the examples	3–4
Attempts to define and compare forms of energy with major errors in terminology and/or description	1–2
Subtotal	/10
Provides a detailed complete list of the non-renewable and renewable sources of energy, with clear, detailed definitions of each source, and a comprehensive outline of the advantages and disadvantages of obtaining and using energy from those sources	11–12
Provides a complete list of the non-renewable and renewable sources of energy, with correct definitions of each source, and an accurate outline of the advantages and disadvantages of obtaining and using energy from those sources	9–10
Provides a list of the non-renewable and renewable sources of energy, with brief correct definitions of each, and an outline of the advantages and disadvantages of obtaining and using energy from those sources	7–8
Provides a list of the non-renewable and renewable sources of energy, with brief definitions of some, and brief outlines of the advantages and disadvantages of obtaining and using energy from those sources	5–6
Provides a list of the non-renewable and renewable sources of energy, with some errors in the definitions, and in an outline of the advantages and disadvantages of obtaining and using energy from those sources, with some errors	3–4
Provides a list of the non-renewable and renewable sources of energy that is incomplete and/or contains errors, and an outline of the advantages and disadvantages of obtaining and using energy from those sources that is incomplete and/or contains errors	1–2
Subtotal	/12
Provides an appropriate reference list	2
Provides a limited reference list	1
Subtotal	/2
Total	/30

Sample assessment task
Engineering Studies – ATAR Year 11
Task 2 Part B – Unit 1

Assessment type: Design

Conditions

Period allowed for completion of the task: 2 weeks.

Task weighting

2% of the school mark for this pair of units

Investigate and demonstrate understanding of the application of fundamental engineering calculations and mechanisms, providing common examples. (20 marks)

Task description

Complete a series of exercises, using correct units of measurement.

- View five examples of dimensioned drawings to determine, through observation or simple calculations
 - the lengths, heights and widths of different components or shapes
 - direct and indirect dimensions: linear measurements, radii, and diameters
 - perimeter of selected plane figures, as listed in Unit 1, including circles.
- Determine surface area, using formulae from a selection, of at least five of the following:
 - square and rectangular plane figures
 - cubes and rectangular right prisms
 - right-triangular plane figures
 - triangular right prisms
 - circles
 - open-ended cylinder.
- Determine volume, using formulae from a selection, of at least five of the following:
 - cubes, rectangular right-prisms, and triangular right-prisms
 - cylinders
 - spheres.

What needs to be submitted for assessment	Due dates
<input type="checkbox"/> Exercises in identifying lengths, heights, widths and other dimensions of components and shapes, and calculating perimeter	
<input type="checkbox"/> Exercises in determining surface area	
<input type="checkbox"/> Exercises in determining volume	

Suggested references

Engineering fundamentals: an introduction to engineering. Moaveni, S. Toronto: Thomson, 2005.

Engineering mechanics: an introduction to statics, dynamics and strength of materials. Ivanoff, V. McGraw-Hill Higher Education, 1996.

Engineering studies: the definitive guide. Volume 1, the preliminary course. Copeland, P. L. Allawah, N.S.W.: Anno Domini, 2000.

Engineering studies: the definitive guide. Volume 2, the HSC course. Copeland, P. L. Allawah, N.S.W.: Anno Domini, 2001.

Engineering studies communication: a student's workbook. Rochford, J. Gosford, N.S.W.: K.J.S., 1999.

Marking key for sample assessment task 2B – Unit 1

Identifying lengths, heights, widths and other dimensions of components and shapes, and calculating perimeter

Description	Mark
Clearly and correctly identifies all lengths, heights and widths, and other dimensions of components and shapes; accurately calculates perimeters	9–10
Correctly identifies all lengths, heights and widths, and other dimensions of components and shapes; with minor adjustments, correctly calculates perimeters	7–8
Correctly identifies most lengths, heights and widths, and other dimensions of components and shapes; correctly calculates most perimeters	5–6
Correctly identifies some lengths, heights and widths, and other dimensions of components and shapes; correctly calculates some simple perimeters	3–4
Correctly identifies a few lengths, heights and widths, and other dimensions of components and shapes; does not calculate perimeters	1–2
Subtotal	/10

Determining surface area

Description	Mark
Uses formulae correctly to determine the surface area of five plane figures, prisms, circles, and open-ended cylinders	4–5
Uses formulae, with some minor errors, to calculate the surface area of plane figures, prisms, circles, and open-ended cylinders	2–3
Uses incorrect formulae or incorrectly uses formulae to calculate the surface area of different shapes	1
Subtotal	/5

Determining volume

Description	Mark
Uses formulae correctly to determine the volume of several cubes, rectangular and triangular right-prisms, cylinders and spheres	4–5
Uses formulae, with some minor errors, to calculate the volume of several shapes	2–3
Uses incomplete or incorrect formulae, or incorrectly uses formulae, to calculate the volume of a few shapes	1
Subtotal	/5
Total	/20

Sample assessment task
 Engineering Studies – ATAR Year 11
 Task 5 – Unit 1

Assessment type: Production

Conditions

Period allowed for completion of the task: 5 weeks

Task weighting

10% of the school mark for this pair of units

Complete context specific skills development exercises

(20 marks)

You are to complete skills development exercises, as demonstrated by your teacher, prior to the production of your proposed project.

Keep a daily work log/time sheet to record your skills development.

Instructions

Document and include the following in your folio/daily work log/time sheet:

- notes on the processes involved in the skills development exercises
- a list of appropriate machines and tools to make the project.

Follow the production process:

- select and use appropriate tools to mark details on your materials, in order to cut the parts detailed in your plan
- select and use appropriate tool/s to accurately cut required parts
- if required, select and use appropriate tools to shape parts
- select and use appropriate tools to assemble parts
- check fit and modify if needed
- check appearance of assembled skill exercise
- apply a finish, if required.

Follow safety practices when using appropriate tools and equipment.

What needs to be submitted for assessment	Due dates
<input type="checkbox"/> Documented folio/daily work log/time sheet	
<input type="checkbox"/> Completed skill exercise (product)	

Marking key for sample assessment task 5 – Unit 1

Documentation in folio/daily work log/time sheet

Description	Mark
Provides a well-recorded, detailed and accurate description of workshop practices	3
Provides the main steps of workshop practices	2
Provides inconsistent notes and partly correct work practices	1
Subtotal	/3

Marking out required parts from plan, with correct selection and use of tools

Description	Mark
Correctly completes marking out	3
Completes marking out with minor errors	2
Completes marking out with significant guidance and/or correction	1
Subtotal	/3

Parts cut and shaped, with correct selection and use of tools

Description	Mark
Cuts all parts accurately with well-shaped results	5–6
Cuts parts with some minor unevenness	3–4
Cuts parts with limited success	1–2
Subtotal	/6

Final presented skill exercise

Description	Mark
Provides a correctly assembled/fitted product showing accurate finished detail	7–8
Provides an assembled/fitted product with an acceptable finished detail	5–6
Provides an assembled/fitted product with minor detail flaws	3–4
Provides an assembled product with poorly fitting parts which shows detail flaws	1–2
Subtotal	/8
Total	/20

Sample assessment task

Engineering Studies – ATAR Year 11

Task 3 – Unit 2

Assessment type: Design

Conditions

Period allowed for completion of the task: 1 week

Task weighting

5% of the school mark for this pair of units

Investigate, define, and compare the forms of obsolescence. Report on advantages and disadvantages for society, industry and the environment that result from the different forms of obsolescence. (20 marks)

Instructions

Research

Write a descriptive report on the different forms of obsolescence.

- Define each of the three forms of obsolescence:
 - technical
 - functional
 - planned.
- Compare the three forms of obsolescence.
- Write about the advantages and disadvantages for society, industry and the environment that result from the different forms of obsolescence.
- Provide a reference list of sources of information.

What needs to be submitted for assessment	Due dates
<input type="checkbox"/> Definitions of the forms of obsolescence	
<input type="checkbox"/> Comparisons of the different forms	
<input type="checkbox"/> Report on advantages and disadvantages for society, industry and the environment that result from the different forms of obsolescence (include a reference list)	

Some suggested references:

Engineering fundamentals: an introduction to engineering. Moaveni, S. Toronto: Thomson, 2005.

Engineering mechanics: an introduction to statics, dynamics and strength of materials. Ivanoff, V. McGraw-Hill Higher Education, 1996.

Engineering studies: the definitive guide. Volume 1, the preliminary course. Copeland, P. L. Allawah, N.S.W.: Anno Domini, 2000.

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Marking key for sample assessment task 3 – Unit 2

Definitions of the forms of obsolescence, with comparisons of the different forms

Description	Mark
Clearly and correctly identifies and defines the forms of obsolescence, with detailed comparisons of the different forms	9–10
Correctly defines the forms of obsolescence, with relevant comparisons of the different forms	7–8
Presents brief, acceptable definitions of the forms of obsolescence, with brief comparisons of the different forms	5–6
Presents brief definitions of the forms of obsolescence, with little attempt to compare the differences	3–4
Makes incorrect use of terminology to define the forms of obsolescence; notes few comparisons	1–2
Subtotal	/10

Report on advantages and disadvantages for society, industry and the environment that result from the different forms of obsolescence

Description	Mark
Provides an accurate, detailed report on the advantages and disadvantages of obsolescence with specific reference to the different forms	7–8
Provides a report on the main advantages and disadvantages of obsolescence with relevant references to the different forms	5–6
Provides a report on some effects of obsolescence with a few references to the different forms	3–4
Provides a report on a few effects of obsolescence which may include incorrect details	1–2
Subtotal	/8

Reference list

Description	Mark
Provides an appropriate reference list	2
Provides a limited reference list	1
Subtotal	/2
Total	/20

Sample assessment task

Engineering Studies – ATAR Year 11

Task 6 – Unit 2

Assessment type: Production

Conditions

Period allowed for completion of the task: 6 weeks

Task weighting

30% of the school mark for this pair of units

Use safe production methods to manufacture a proposed project (30 marks)

This assessment will require you to use project management skills for timely development and testing of the project.

Using your prepared production plan, materials and available equipment, you will construct a prototype or working model. You will select and use appropriate tools and machines and follow safe work practices. You will test those aspects of the prototype or working model that have been completed for correct function, and document your testing using checklists and gathered data. You will record your progress in a design folio.

What you need to document and include in your design folio

- Project management notes based on production plan
- Photographs of completed project

Instructions

- Follow proposed production plan
- Use a timeline to construct and test the solution
 - maintain safety requirements
 - record any changes to materials lists or costing
 - record changes to production plan
- Construct solution by selecting and using appropriate tools and machines, following safe work practices
- Use ongoing evaluation techniques: folio notes and use of photography to record ongoing progress/decision changes made to the project

What needs to be submitted for assessment	Due dates
<input type="checkbox"/> Stages of production (teacher observation)	
<input type="checkbox"/> Record of production process, testing and adjustments/changes	
<input type="checkbox"/> Completed project	

Marking key for sample assessment task 6 – Unit 2

Contents and notes on production process in design folio

Description	Mark
Records changes to design or workshop practices	2
Keeps inconsistent records of changes	1
Subtotal	/2

Completed marking out of material/s as required from plan and cut parts to required shapes using appropriate tools

Description	Mark
Completes marking out correctly and cuts all parts to the correct size and square	5
Completes marking out and cuts parts to the correct size	4
Completes marking out with minor corrections and cuts parts to the correct size	3
Completes marking out with some parts reshaped	2
Completes marking out with correction and cuts pieces with errors, requiring the cutting of a replacement piece	1
Subtotal	/5

Completed assembly/fitting of project parts

Description	Mark
Assembles all parts and joints, with even and square fit	9–10
Assembles all parts and joints, with minor corrected unevenness	7–8
Assembles all parts and joints, with minor shape unevenness	5–6
Assembles all parts and joints, but some requires second attempt and/or joints shows some poor fit	3–4
Assembles parts, but joints show poor fit, and some require additional material for second attempt	1–2
Subtotal	/10

Testing and ongoing evaluation at stages of production

Description	Mark
Documents careful and regular testing and evaluation of production processes	3
Documents occasional testing and evaluation of production processes	2
Documents general information about production processes	1
Subtotal	/3

Completed functioning project

Description	Mark
Presents a project with correctly functioning parts, which has been tested repeatedly and continues to operate effectively	8–10
Presents a project with inconsistent functioning parts or project requiring adjustments, which operates intermittently	5–7
Presents a project with production or assembly errors or poor fitting parts, which does not function	1–4
Subtotal	/10
Total	/30

Sample assessment task

Engineering Studies – ATAR Year 11

Task 7– Unit 2

Assessment type: Design

Conditions

Period allowed for completion of the task: 1 week, completed towards the final week of the term.

Task weighting

5% of the school mark for this pair of units

Test and evaluate your finished project by responding to evaluation questions. (20 marks)

Instructions

Test the solution for correct function and document testing using checklists and test data.

Write clear statements to evaluate the project. Comment on the following key points.

- Did the project meet the design requirements?
 - compare project against design ideas and final drawings
 - comment on appearance, function and safety
 - shape and size
 - finish
 - operating efficiency
 - safe usage
- Did the manufacturing processes achieve a quality project?
 - 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 the production procedure
- Could the shape, size and design features of the project be improved?
 - comment on variations and changes to the design – aesthetics, materials and function

What needs to be submitted for assessment	Due dates
<input type="checkbox"/> Completed tested project and evaluation report	

Marking key for sample assessment task 7 – Unit 2

Evaluation of the specifications and design considerations of aesthetics, function and safety

Description	Mark
Provides clear comments referring to specific design considerations combined with justification of product's fulfilment of design brief requirements	9–10
Provides comments outlining major uses and function, and referring to points within design brief	7–8
Provides comments linked to design brief expressing personal likes and dislikes about finished project	5–6
Provides comments outlining use of project, but little reference to design brief requirements	3–4
Provides comments that give a superficial evaluation of the project	1–2
Subtotal	/10

Evaluation of the manufacturing processes

Description	Mark
Provides a clear evaluation of all procedures with reference to specific procedures and improvements with little or no variation of process	5
Provides appropriate reporting and/or comment on procedures with some logical evaluation of operations, with little or minor variation of process	4
Provides comments on procedures with limited evaluation of operations, and some major correction of process	3
Provides brief comments with a few references to major changes to process	2
Provides comments that give a superficial evaluation of the process	1
Subtotal	/5

Evaluation of possible improvements

Description	Mark
Provides clear comments referring to aesthetics, function and safety influenced by shape and size, and suggests improvements	5
Provides comments referring to major design considerations and suggests improvements	4
Provides some comments expressing personal likes and dislikes about the design and mentions improvements	3
Provides a brief reference to design changes to improve function or aesthetics	2
Provides a few comments/superficial notes on improvements	1
Subtotal	/5
Total	/20