



Queensland Curriculum and Assessment Authority

Essential Mathematics 2019 v1.1

IA1: Sample assessment instrument

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Student name

Student number

Teacher

Issued

Due date

Marking summary

Criterion
Formulate Assessment objectives 1, 2, 5
Solve Assessment objectives 1, 6
Evaluate and verify Assessment objectives 4, 5
Communicate Assessment objective 3
Overall grade

Conditions

Technique	Problem-solving and modelling task
Unit	Unit 3: Measurement, scales and data
Topic/s	Fundamental topic: Calculations Topic 1: Measurement Topic 2: Scales, plans and models Topic 3: Summarising and comparing data
Duration	5 weeks (including 10 hours of class time)
Mode/length	Written: Up to 8 pages (including tables, figures and diagrams) and a maximum of 1000 words
Individual/group	A unique response must be developed by each student
Other	Use of technology is required and must go beyond simple computation or word processing
Resources	The technology used can include scientific calculator, graphics calculator (CAS or non-CAS), spreadsheet program and/or other mathematical software

Context

Whether we live in a city, in a small town, on a farm or in a remote community, water availability affects us all. With uncertain rainfall during periods of drought, many householders try to minimise water wastage and supplement their council's water supply with rainwater. The Queensland Government encourages this through its 'Using water wisely' campaign, which shows how to save water and gives advice on using rainwater tanks.

Tanks are available in shapes and sizes to fit even the smallest spaces. It is becoming more common to have a rainwater tank in the backyard of a suburban house, but, as space is often limited, certain restrictions must be placed on the tank size and design.

Task

You are to develop a report recommending a suitable rainwater tank for Alyssa and Preston to install at their home to supplement their family's water needs. Their single-storey home has gutters 2.4 m above the ground.

Your teacher will give you information about the couple and the 'Careful water use' table, which shows how much water certain activities use.

Your response will be in the form of a report. It should outline options and considerations for the couple's goals, so they can decide on an appropriate rainwater tank.

To complete this task, you must:

- consider the stimulus information
- use your knowledge of the subject matter in Unit 3 Topics 1–3 to investigate the problem
- ensure you cover both simple and complex subject matter
- ensure your response demonstrates characteristics in the instrument-specific standards
- develop a unique response in a coherent and concise written format that is appropriate to the genre and includes a suitable introduction, body and conclusion
- show all calculations to support your response
- follow the approach to problem-solving and mathematical modelling used in the syllabus
- use a spreadsheet to demonstrate relevant calculations.

Stimulus

Current information about Alyssa and Preston

- Location of home:
- Number of children:
- Flow-off rate (from roof):

Careful water use

Use	Amount per person per month (litres)
Drinking, cooking	300
Dishwashing	150
Bathroom and toilet	2500
Washing clothes	200
A garden hose uses about 700 litres per hour.	

Source: Queensland Government, n.d. 'Using water wisely', www.qld.gov.au/environment/water/use.

Checkpoints

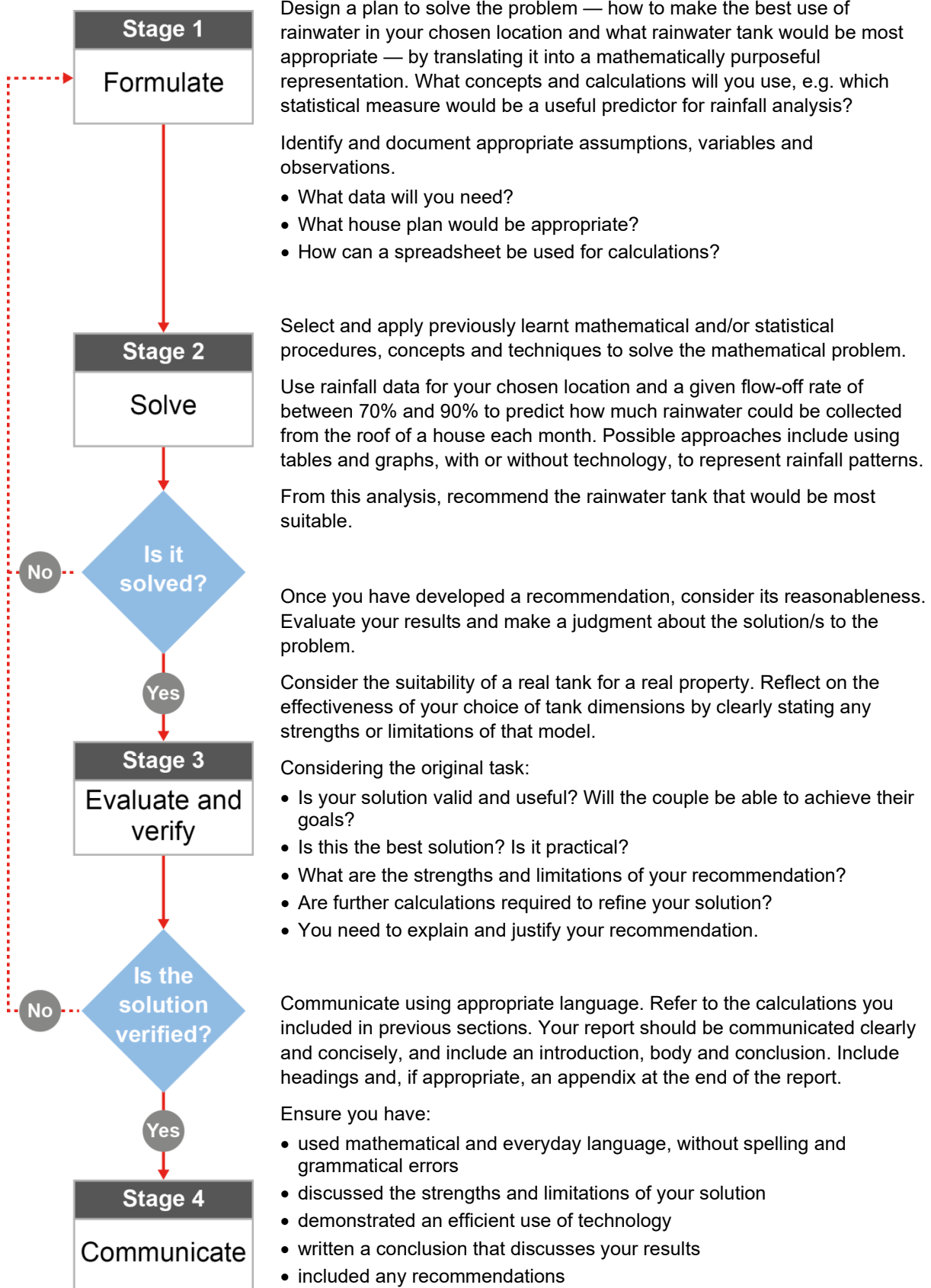
- One week after issue date: Students email an assessment plan to their teacher.
- Two weeks after issue date: Teacher sights evidence of student progress in class and records progress.
- Three weeks after issue date: Students email a draft for feedback. Teacher will provide general feedback to the class but no individual corrections.
- Four weeks after issue date: Teacher interviews each student to ensure authorship.
- Five weeks after issue date: Students submit their final response.

Authentication strategies

- You will be provided class time for task completion.
- You will each produce a unique response by using individualised data and producing a unique report.
- You will provide documentation of your progress at indicated checkpoints.
- Your teacher will ensure class cross-marking occurs.
- You will use plagiarism-detection software to submit your response.
- You must acknowledge all sources.
- You must submit a declaration of authenticity.

Scaffolding

The approach to problem-solving and mathematical modelling must be used.



Instrument-specific standards (IA1): Problem-solving and modelling task

Formulate	Solve	Evaluate and verify	Communicate	Grade
The student work has the following characteristics:				
<ul style="list-style-type: none"> documentation of appropriate assumptions accurate documentation of relevant observations accurate translation of all simple and complex aspects of the problem by identifying mathematical concepts and techniques. 	<ul style="list-style-type: none"> accurate use of complex procedures to reach a valid solution discerning application of simple and complex mathematical concepts and techniques relevant to the task accurate and appropriate use of technology. 	<ul style="list-style-type: none"> evaluation of the reasonableness of solutions by considering the results, assumptions and observations documentation of relevant strengths and limitations of the solution and/or model justification of decisions made using mathematical reasoning. 	<ul style="list-style-type: none"> correct use of appropriate technical vocabulary, procedural vocabulary and conventions to develop the response. coherent and concise organisation of the response, appropriate to the genre, including a suitable introduction, body and conclusion. 	A
<ul style="list-style-type: none"> statements of appropriate assumptions statements of relevant observations translation of simple and complex aspects of the problem by identifying mathematical concepts and techniques. 	<ul style="list-style-type: none"> use of complex procedures to reach a reasonable solution application of simple and complex mathematical concepts and techniques relevant to the task appropriate use of technology. 	<ul style="list-style-type: none"> statements about the reasonableness of solutions by considering the context of the task statements about relevant strengths and limitations of the solution and/or model statements about decisions made relevant to the context of the task. 	<ul style="list-style-type: none"> use of technical vocabulary, procedural vocabulary and conventions to develop the response organisation of the response, including a suitable introduction, body and conclusion. 	B
<ul style="list-style-type: none"> statement of assumptions statement of observations translation of simple aspects of the problem by identifying mathematical concepts and techniques. 	<ul style="list-style-type: none"> use of simple procedures to make some progress towards a solution application of simple mathematical concepts and techniques relevant to the task use of technology. 	<ul style="list-style-type: none"> statement about the reasonableness of solutions statement about strengths and/or limitations of the solution and/or model statement about decisions made. 	<ul style="list-style-type: none"> use of some appropriate language and conventions to develop the response adequate organisation of the response. 	C
<ul style="list-style-type: none"> statement of an assumption or an observation translation of some simple aspects of the problem by identifying mathematical concepts and techniques. 	<ul style="list-style-type: none"> application of some simple procedures, mathematical concepts or techniques superficial use of technology. 	<ul style="list-style-type: none"> statement about a decision and/or the reasonableness of a solution. 	<ul style="list-style-type: none"> use of everyday language to develop a response basic organisation of the response. 	D
<ul style="list-style-type: none"> statement of an assumption, observation or translation of an aspect of the problem. 	<ul style="list-style-type: none"> inappropriate use of technology or procedures. 	<ul style="list-style-type: none"> inappropriate statement about a decision or the reasonableness of a solution. 	<ul style="list-style-type: none"> unclear and disjointed organisation of the response. 	E

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