ISA

Mathematical Literacy
Sample Materials

Grade 5
Grade 6
Grade 7

Australian Council *for* Educational Research

ACER

ISA Mathematical Literacy Sample Materials

Grade 5, Grade 6 and Grade 7

This collection of mathematical literacy sample materials represents a typical range of mathematics material in ISA tests from Grade 5 to Grade 7. The purpose of this collection is to show teachers examples of the kinds of mathematical literacy that are used in the ISA.

Questions in context

This collection has 5 units containing a total of 13 questions. Each unit establishes a context for the questions associated with it. An actual ISA mathematical literacy test has 15-20 units set in a wide variety of contexts, with a total of 30-35 questions. The units included in this marking guide are:

- Treasure Hunt
- Spinner
- Bean Plant
- Walking for Charity
- Herb Garden

The pages following the sample units show the classification, descriptor and marking guide for each question.

Classification of questions

Questions are classified by Process –

Formulating, Employing or Interpreting

and by Content –

Quantity, Change and Relationships, Space and Shape, or Uncertainty and Data

Question descriptors

The descriptors for each question provide the basis for the described scales of achievement on which ISA results are reported.

Question format

This collection has 4 multiple-choice questions and 9 open-ended questions requiring students to write a response. An actual ISA test has 50 per cent multiple-choice questions and 50 per cent open-ended questions. Some of the open-ended questions only require a short answer; others require a calculation or an explanation. Examples

of both kinds of open-ended questions are included. The marking guide shows how the open-ended questions are scored.

This collection of materials is not a test.

The materials in this collection have NOT been selected to represent the typical range of difficulty of an ISA test. An actual ISA test is carefully constructed to ensure that the range of difficulty of the questions reflects the range of mathematical ability or the population for each grade.

The materials in this collection cover Grade 5, 6 and 7. Some materials may be too hard for Grade 5 and some materials may be too easy for Grade 7. If a teacher wants to use some of these materials for students to practise on, it is important that the teacher only selects the units that are of an appropriate level of difficulty for their students.

Teachers should use this material as a model. Teachers can develop questions that assess similar kinds of skills using their own mathematics materials.

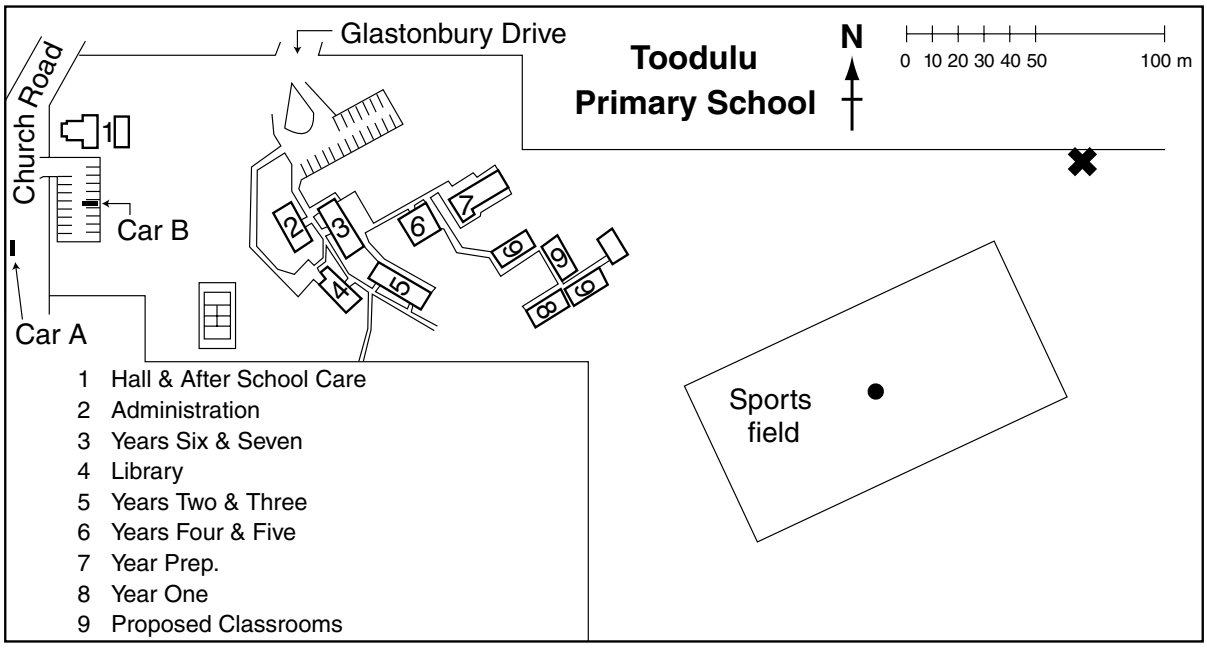
Other ISA Sample Mathematical Literacy Collections:

- Grade 3, 4 and 5
- Grade 8, 9 and 10

Treasure Hunt

A teacher has organised a Treasure Hunt for her class.

This is a map of the school.



S35014

1 About how far do the students need to walk from the centre of the sports field to the treasure at ✖ ?

_____ m

S35013

2 A driver in Car A, heading north on Church Road, wishes to enter the car park off Church Road and park next to Car B.

Which turns should the driver make?

- ☐ Turn left, turn left, turn right
- ☐ Turn right, turn left, turn right
- ☐ Turn right, turn left, turn left
- ☐ Turn right, turn right, turn left
- ☐ Turn right, turn right, turn right

Treasure Hunt

S3015

3 The Treasure Hunt begins at 11.45 am.

The winner finds the treasure at 1.15 pm.

The table below contains statements about the Treasure Hunt.

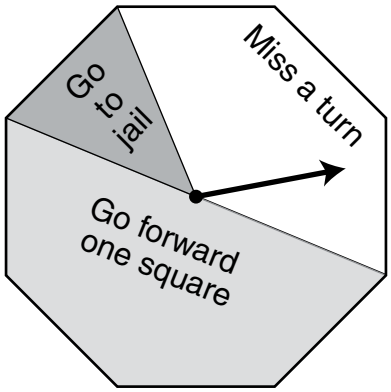
Select 'True' or 'False' for each statement.

Statement	True	False
It takes the winner exactly 30 minutes to find the treasure.	☐	☐
The winner finds the treasure at 13.15.	☐	☐

Spinner

In a game, this 8-sided spinner is used.

In the diagram the spinner shows ‘Miss a turn’.



S35003

4 The spinner was used 200 times.

About how many times would you expect the result ‘Go to jail’?

_____

S35004

5 In one game, the spinner landed on ‘Miss a turn’ 30 times. What is the most likely number of times that the spinner was used?

Show your working.

_____

_____

_____

Bean Plant

Week 1 Week 2 Week 3 Week 4

Angelique measured the height of a bean plant each Saturday for four weeks.

Her measurements are shown in the table.

Week	Date	Height
1	March 1	2 cm
2	March 8	8 cm
3	March 15	14 cm
4	March 22	20 cm

Use this calendar to answer the next two questions.

March						
S	M	T	W	T	F	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

April						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Bean Plant

S33031

6 What height would you expect Angelique's plant to be on Saturday April 5 if it keeps growing in the same way?

_____ cm

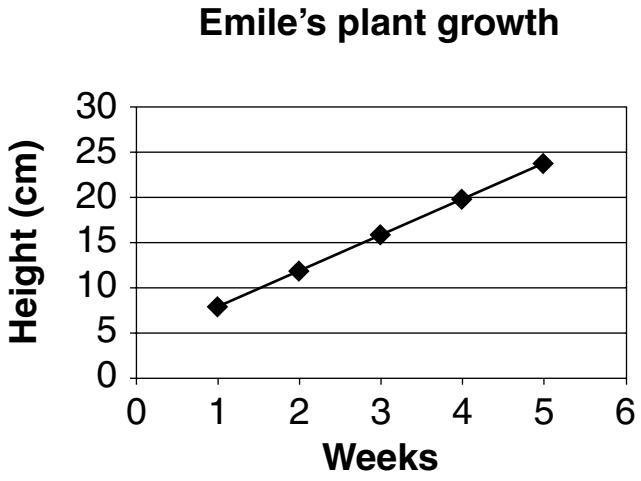
S33032

7 On what **date** would you expect Angelique's plant to reach 50 cm if it keeps growing in the same way?

_____

Angelique's friend Emile started measuring a different bean plant on Saturday in Week 1 also.

He decided to make a graph of the growth of his plant.

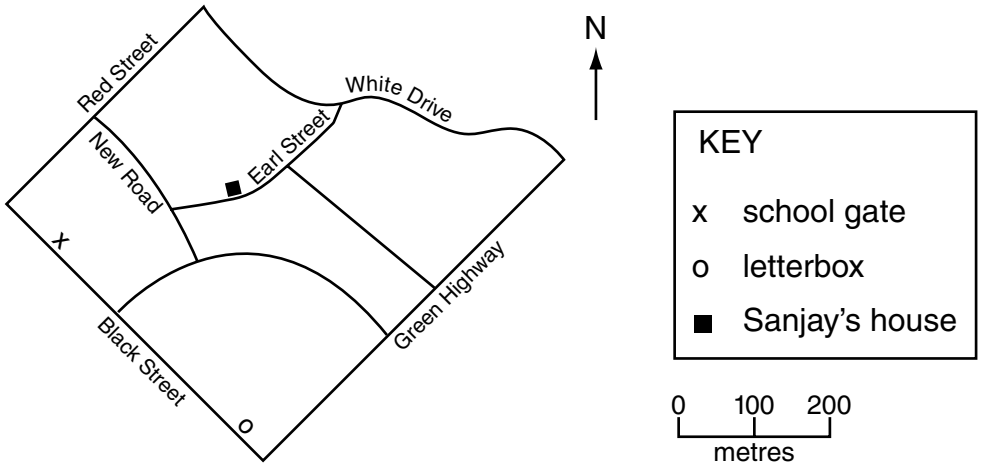


S33034

8 In which week did Angelique's plant have the **same** height as Emile's plant?

_____

Walking for Charity



M073023

9 Estimate the distance from the school gate to the letterbox in metres.

_____ metres

M073024

10 Sanjay walked along Black Street from the school gate to the letterbox.

In which direction did he walk?

- ☐ NE
- ☐ NW
- ☐ SE
- ☐ SW

M073025

11 To walk home from school, Sanjay turned from Black Street into Red Street, then into New Road and finally into Earl Street.

The turns he made were

- ☐ right, right and left.
- ☐ right, right and right.
- ☐ left, left and right.
- ☐ left, left and left.

Walking for Charity

M073026

12 Sanjay collected money for charity by walking a circuit around his neighbourhood.

For every circuit, Sanjay collected 2.00 zeds from his mother and 1.50 zeds from his father.

Sanjay collected a total of 17.50 zeds from his mother and father.

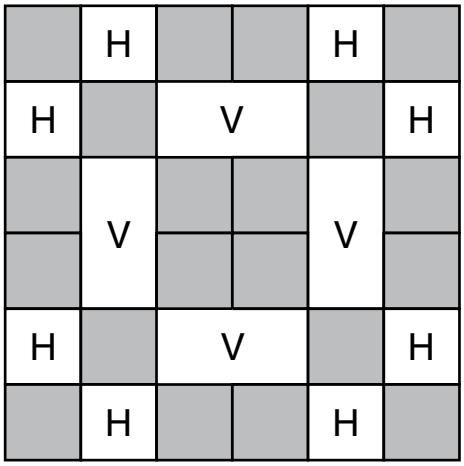
How many circuits did he complete?

_____ circuits

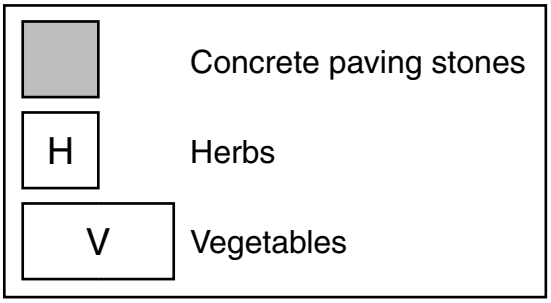
Herb Garden

This is a design for a square garden. Part of the garden is planted with herbs (H) and vegetables (V).

The shaded squares are concrete paving stones.



Key



M042501

13 The garden design is symmetrical.

Draw in all the lines of symmetry on the diagram.

Marking Guides
Grade 5, Grade 6 and Grade 7

Treasure Hunt

Q1 **About how far do the students need to walk from the centre of the sports field to the treasure at ✖?**

Process: Employing

Content: Shape and Space

Descriptor: Estimate distance in metres on a map using a simple scale.

Marking guide

Code 1	Any answer between 110 and 130
Code 0	Other
Code 9	Missing

Q2 **A driver in Car A, heading north on Church Road, wishes to enter the car park off Church Road and park next to Car B.**

Which turns should the driver make?

Process: Employing

Content: Shape and Space

Descriptor: Read a map and determine the turn directions (left/right) needed to get from point A to point B.

Key: D – Turn right, turn right, turn left

Q3 **The Treasure Hunt begins at 11.45 am.**

The winner finds the treasure at 1.15 pm.

The table below contains statements about the Treasure Hunt.

Select 'True' or 'False' for each statement.

Process: Employing

Content: Quantity

Descriptor: Determine the accuracy of statements regarding elapsed time and conversion between 24 and 12 hour time format.

Marking guide

Code 1	Two correct: False, True in that order
Code 0	Less than two correct.
Code 9	Missing

Spinner

Q4 **The spinner was used 200 times. About how many times would you expect the result 'Go to jail'?**

Process:	Formulating
Content:	Uncertainty and Data
Descriptor:	Demonstrate a correct method to find the expected number of occurrences of an event with a known probability from a given number of trials.

Marking guide

Code 2	25, 'About 25', or '20–30'. Working not required. Correct method is 1/8 of 200, 200 ÷ 8, or repeated halving 200, 100, 50, 25
Code 1	Correct method but incorrect answer or incomplete
Code 0	Other
Code 9	Missing

Q5 **In one game, the spinner landed on 'Miss a turn' 30 times. What is the most likely number of times that the spinner was used?**

Show your working.

Process:	Employing
Content:	Uncertainty and Data
Descriptor:	Demonstrate a correct method for finding the most likely number of trials needed to achieve a given number of occurrences of a chance event.

Marking guide

Code 2	80. Working not required. Correct method is one of: trial-and-error (e.g. 3/8 of 200 = 75, too big; 3/8 of 160 = 60, too big)
OR	"If 3/8 of n = 30, then 1/8 of n = 10 and so n = 80"
OR	other acceptable method (e.g. allocating 10 to each side of the octagon)
Code 1	Correct method but incorrect answer or incomplete (e.g. 30 ÷ 8; 30 × 8 = 240)
Code 0	Other including 30 × 3 = 90
Code 9	Missing

Bean Plant

Q6 **What height would you expect Angelique's plant to be on Saturday April 5 if it keeps growing in the same way?**

Process:	Employing
Content:	Change and Relationships
Descriptor:	Find a value on a given date, combining information from a calendar and a table showing a pattern of growth.

Marking guide

Code 1	32
Code 0	Other, including marks/calculations on the previous page
Code 9	Missing (i.e. no marks on either page)

Q7 **On what date would you expect Angelique's plant to reach 50 cm if it keeps growing in the same way?**

Process:	Employing
Content:	Change and Relationships
Descriptor:	Given a new value, extrapolate from a table showing a pattern of growth to find a date on a calendar.

Marking guide

Code 1	April 26 or just '26' or 'April 20–26'
Code 0	Other, such as week 9
Code 9	Missing

Q8 **In which week did Angelique's plant have the same height as Emile's plant?**

Process:	Interpreting
Content:	Change and Relationships
Descriptor:	Compare growth data in a table with those in a linear graph.

Marking guide

Code 1	Week 4 (or just '4') or March 22
Code 0	Other
Code 9	Missing

Walking For Charity

Q9 **Estimate the distance from the school gate to the letterbox in metres.**

Process: Employing

Content: Quantity

Descriptor: Use simple scale to estimate distance on map.

Marking guide

Code 2	Any number in the range [325, 375] metres
Code 1	Any number in the range [300, 325) or (375, 400]
Code 0	Other
Code 9	Missing

Q10 **Sanjay walked along Black Street from the school gate to the letterbox.**

In which direction did he walk?

Process: Formulating

Content: Shape and Space

Descriptor: Determine compass direction of route on map.

Key: C – SE

Q11 **To walk home from school, Sanjay turned from Black Street into Red Street, then into New Road and finally into Earl Street.**

The turns he made were

Process: Formulating

Content: Shape and Space

Descriptor: Select the set of instructions that match a given route on a map.

Key: A – right, right and left

Q12 **Sanjay collected money for charity by walking a circuit around his neighbourhood.**

For every circuit, Sanjay collected 2.00 zeds from his mother and 1.50 zeds from his father.

Sanjay collected a total of 17.50 zeds from his mother and father.

How many circuits did he complete?

Process: Interpreting

Content: Quantity

Descriptor: Solve a multi-step word problem involving money.

Marking guide

Code 1	5
Code 0	Other
Code 9	Missing

Herb Garden

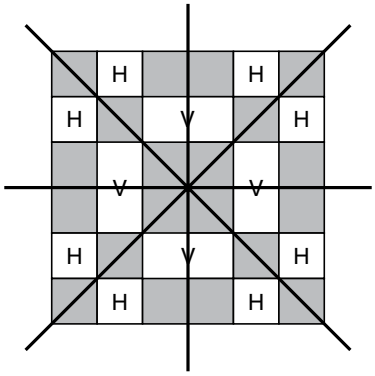
Q13 **The garden design is symmetrical.**

Draw in all the lines of symmetry on the diagram.

Process:	Formulating
Content:	Shape and Space
Descriptor:	Draw all the lines of symmetry on a common geometric figure.

Marking guide

Code 2	All 4 lines of symmetry as shown. Accept dotted or broken lines



Code 1	Any 2 (or 3) lines of symmetry
Code 0	Other (1 line of symmetry or lines too inaccurately drawn)
Code 9	Missing