



# DESCRIBED PROFICIENCY SCALE FOR THE LITERACY AND NUMERACY TEST FOR INITIAL TEACHER EDUCATION STUDENTS

July 2017



## Described Proficiency Scale for the Literacy and Numeracy Test for Initial Teacher Education Students

This paper outlines the skills assessed by the national Literacy and Numeracy Test for Initial Teacher Education Students ('the test') and how candidates' achievement of the standard required by the test is determined. The paper also describes the level of proficiency of candidates and whether they are clearly above; at and above; or below the test standard.

### Background to the test

The test assesses aspects of the personal literacy and numeracy proficiency of initial teacher education students.

All students undertaking initial teacher education programs in Australia are expected to sit the test and demonstrate they have personal literacy and numeracy skills in the top 30 per cent of the Australian adult population ('the test standard') prior to graduating from their program. This requirement is described in the national program standards: the *Accreditation of Initial Teacher Education Programs in Australia, Standards and Procedures, December 2015*. The relevant standard is Standard 3.5.

**Standard 3.5** Entrants to initial teacher education will possess levels of personal literacy and numeracy broadly equivalent to the top 30% of the population. Providers who select students who do not meet this requirement must establish satisfactory arrangements to ensure that these students are supported to achieve the required standard before graduation. The National Literacy and Numeracy Test is the means for demonstrating that all students have met the standard.

The test standards (benchmarks) for literacy and numeracy were set with reference to the judgement of groups of literacy and numeracy experts comprising teacher educators, members of teacher regulatory boards, school leaders and assessment professionals; and to the literacy and numeracy results for Australian adults from the Organisation for Economic Co-operation and Development's Programme for International Assessment of Adult Competencies (2011–12).

### Reporting candidate achievement

As part of their statement of test results, candidates receive advice as to which of three bands their test score falls within for each test component (literacy and numeracy).

The three bands are:

- Band 3: Clearly above the test standard
- Band 2: At and above the test standard
- Band 1: Below the test standard

A small number of candidates may achieve scores above Band 3 or below Band 1. It is not possible to describe these regions on the scale because there are insufficient questions at these levels on the test. Descriptions of Bands 1, 2 and 3 are provided in the tables that follow. The band achieved, together with any bands below it, shows candidates the kinds of personal literacy or numeracy skills and knowledge they are currently demonstrating. Where appropriate, candidates can refer to the statement in

the band above their test score to inform them of the skills that are required to reach a higher standard of personal literacy or numeracy.

Candidates who have not achieved Band 2 should also seek support from their higher education provider before re-sitting the test. The test administrator, the Australian Council for Educational Research, issues providers with candidates' achievement in the sub-domains of each test component (literacy and numeracy) which assists providers to offer appropriate support to improve candidates' skills in the applicable sub-domain(s).

The skills, knowledge and understanding demonstrated by candidates in each of the three bands are provided on pages 3–13 for literacy and pages 14–36 for numeracy. Sample literacy and numeracy questions for each band are included for illustrative purposes.

## Described proficiency bands for literacy

The following descriptions reflect the main *content* and *processes* assessed in the literacy component of the test. For literacy, the *content* elements are reading and technical skills of writing (syntax, grammar and punctuation, spelling, word usage and text organisation). The *process* elements of reading are access and identify, integrate and interpret, and evaluate and reflect.

Table 1: Band descriptions for Reading


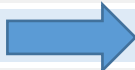

Reading	Band 1: Below the test standard	Band 2: At and above the test standard	Band 3: Clearly above the test standard
	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>locate directly stated information in a range of forms of writing, including factual, persuasive and narrative texts, and texts with combinations of written material and images, graphs or tables</li> <li>identify attitudes and opinions clearly expressed in the texts</li> </ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>demonstrate the skills described in Band 1</li> <li>make connections between information from different parts of texts that take a variety of forms</li> <li>apply this information in making interpretations</li> <li>infer the position adopted by the writer of the text</li> </ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>demonstrate the skills described in Band 1 and Band 2</li> <li> synthesise, evaluate information from multiple parts of texts that take a variety of forms, including academic texts employing high-level vocabulary</li> <li>interpret the effect of language in communicating ideas and feelings</li> <li>evaluate the strategy adopted by the writer of a text</li> <li>evaluate the significance of textual elements (e.g. a quotation within an academic text)</li> </ul>
	<b>Skills required to transition from Band 1 to Band 2</b> 		
	<ul style="list-style-type: none"> <li>make connections between information in texts</li> <li>interpret information and the writer's position in texts</li> <li>negotiate more sophisticated contexts and more subtle purposes in texts</li> </ul>		
		<b>Skills required to transition from Band 2 to Band 3</b> 	
		<ul style="list-style-type: none"> <li>evaluate information, positions and strategies</li> <li>interpret the effect of language and other textual elements</li> </ul>	

Table 2: Band descriptions for Technical Skills of Writing

Technical skills of writing	Band 1: Below the test standard	Band 2: At and above the test standard	Band 3: Clearly above the test standard
	<p>Candidates can typically</p> <ul style="list-style-type: none"><li>• identify written language use that is clearly inappropriate to a situation and purpose</li><li>• correctly spell and use some words that are frequently misspelt, including homophones (e.g. new and knew)</li><li>• recognise and apply aspects of punctuation (e.g. in direct speech)</li><li>• extend plans for writing (e.g. accurately place a new idea into an existing structure of ideas)</li></ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"><li>• demonstrate the skills described in Band 1</li><li>• select appropriate over inappropriate written language for a situation and purpose</li><li>• correctly spell some polysyllabic words (words with several syllables), including some that are frequently misspelt</li><li>• recognise and apply aspects of punctuation that are frequently misused (e.g. apostrophes)</li><li>• revise plans for writing (e.g. identify whether and how a new idea fits into an existing structure of ideas)</li></ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"><li>• demonstrate the skills described in Band 1 and Band 2</li><li>• identify synonyms for high-level words</li><li>• correctly spell some difficult polysyllabic words</li><li>• correctly use less common punctuation marks (e.g. semi-colons)</li><li>• critique and improve upon an existing structure of ideas in a plan for writing</li></ul>
	<ul style="list-style-type: none"><li>• <b>Skills required to transition from Band 1 to Band 2</b></li></ul>		
	<ul style="list-style-type: none"><li>• correctly spell more difficult words</li><li>• correctly use more commonly misused punctuation</li><li>• have greater understanding of how to express ideas in a piece of writing and how they should be structured</li></ul>		
		<p><b>Skills required to transition from Band 2 to Band 3</b></p> <ul style="list-style-type: none"><li>• know the meaning and spelling of more difficult words</li><li>• correctly use less common punctuation</li><li>• structure writing in a sophisticated way</li></ul>	

## Sample questions illustrating the literacy band descriptions

### Band 1: Below the test standard

#### Question 1

This literacy sample question is representative of the reading skills of candidates at Band 1: Below the test standard. It requires candidates to locate directly stated information in a text with combinations of written material and images, graphs or tables.

The question refers to the text *Reading Success Test* in the Appendix.<sup>1</sup>

Which question appears to have been the most difficult for the students in this class?

Type the question number into the box below.

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Reading
<i>Text type</i>	Informative
<i>Process</i>	Access and identify
<i>Context</i>	Further education and professional learning
<i>Indicative ACSF<sup>2</sup> Level</i>	3
<i>Relevant ACSF descriptor</i>	Understands familiar texts of limited complexity that may incorporate graphs, tables and charts
<i>Correct response</i>	12

<sup>1</sup> In the online test, stimulus text appears onscreen with each related question.

<sup>2</sup> The Australian Core Skills Framework <https://www.education.gov.au/australian-core-skills-framework>

## Question 2

This literacy sample question is representative of the technical skills of writing of candidates at Band 1: Below the test standard. Candidates are required to extend plans for writing (accurately place a new idea into an existing structure of ideas).

The question refers to the text *Homework* in the Appendix.

All the information about the task needs to be put into the homework template.

Select the best heading from the homework template for each of the numbered sentences.

	<b>Learning goals</b>	<b>Equipment required</b>	<b>The task</b>	<b>Submission requirements</b>
1. Get some thin cardboard from home (cereal boxes are good) or the paper recycling unit at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. You will make three solid shapes out of cardboard and sticky tape, with the following volumes: 9, 24 and 154 cubic centimetres.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. You will apply your knowledge of numbers, measurement and nets to construct some solids.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Hand in your calculations, the net design with the dimensions, and the three solids by the end of next week.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Technical skills of writing
<i>Technical skill of writing</i>	Text organisation
<i>Context</i>	Schools and teaching
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Displays logical organisational structure in writing through the use of coherently linked paragraphs
<i>Correct response</i>	Equipment required, The task, Learning goals, Submission requirements



## Band 2: At and above the test standard

### Question 3

This literacy sample question is representative of the reading skills of candidates at Band 2: At and above the test standard. The question requires candidates to infer the position adopted by the writer of the text.

The question refers to the text *Letter From Hanoi* in the Appendix.

The writer believes that the Christmas celebration is characterised by

- A. angst and disharmony.
- B. shallow entertainment.
- C. making the most out of life.
- D. a high regard for Vietnamese traditions.

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Reading
<i>Text type</i>	Descriptive
<i>Process</i>	Integrate and interpret
<i>Context</i>	Personal and community
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Understands texts incorporating some abstract ideas, symbolism and embedded information, in which the relationship between concepts and information is not explicit and requires inference and interpretation
<i>Correct response</i>	C

#### Question 4

This literacy sample question is representative of the reading skills of candidates at Band 2: At and above the test standard. The question requires the candidates to apply information in making interpretations.

The question refers to the text [Letter From Hanoi](#) in the Appendix.

The writer appears to regard the children as

- A. studious.
- B. reserved.
- C. resourceful.
- D. accident-prone.

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Reading
<i>Text type</i>	Descriptive
<i>Process</i>	Integrate and interpret
<i>Context</i>	Personal and community
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Understands texts incorporating some abstract ideas, symbolism and embedded information, in which the relationship between concepts and information is not explicit and requires inference and interpretation
<i>Correct response</i>	C

### Question 5

This literacy sample question is representative of the technical skills of writing of candidates at Band 2: At and above the test standard. Candidates are required to correctly spell a polysyllabic word that is frequently misspelt.

The sentence below contains one misspelt word.

*Williams (2014) offers an elaborate and insightful analyses and critique of contemporary pedagogical practice.*

Type the word as it should appear.

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Technical skills of writing
<i>Technical skill of writing</i>	Spelling
<i>Context</i>	Schools and teaching
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Accurately spells frequently used words, including relevant technical terms and specialised vocabulary
<i>Correct response</i>	analysis

### Question 6

This literacy sample question is representative of the technical skills of writing (punctuation) of candidates at Band 2: At and above the test standard. Candidates are required to apply aspects of punctuation that are frequently misused (apostrophes).

If the sentence below contains an error, correct the error by typing the word as it should appear (type **only one word**); if there is no error, type N.

*Respect everyones right to learn without interruption or disturbance.*

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Technical skills of writing
<i>Technical skill of writing</i>	Syntax, Grammar and Punctuation
<i>Context</i>	Schools and teaching
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Use punctuation as an aid to understanding, e.g. capitalisation, full stops, commas, apostrophes, question marks and quotation marks
<i>Correct response</i>	everyone's

### Band 3: Clearly above the test standard

#### Question 7

This literacy sample question is representative of the reading skills of candidates at Band 3: Clearly above the test standard. The question requires the candidates to evaluate the strategy adopted by the writer of a text.

The question refers to the text *Letter from Hanoi* in the Appendix.

The writer expresses a feeling of conflict in paragraph 1.

The conflict is between

- A. authority and caution.
- B. tradition and flexibility.
- C. tradition and superiority.
- D. authority and irresponsibility.

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Reading
<i>Text type</i>	Descriptive
<i>Process</i>	Evaluate and reflect
<i>Context</i>	Personal and community
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Understands texts incorporating some abstract ideas, symbolism and embedded information, in which the relationship between concepts and information is not explicit and requires inference and interpretation
<i>Correct response</i>	B

### Question 8

This literacy sample question is representative of the reading skills of candidates at Band 3: Clearly above the test standard. The question relates to a text that includes different text formats, and requires the candidates to evaluate information from multiple parts of the text.

The question refers to the text *Reading Success Test* in the Appendix.

Are the statements listed below true or false for the Making Pies unit?		
Select 'True' or 'False' for each statement.		
<b>Statement</b>	<b>True</b>	<b>False</b>
The RI (Retrieving information) question is categorised as easier than the IE (Interpreting explicit information) question.	<input type="radio"/>	<input type="radio"/>
The II (Interpreting by making inferences) question is categorised as more difficult than the IE (Interpreting explicit information) question.	<input type="radio"/>	<input type="radio"/>
The RF (Reflecting on texts) question is the most difficult type of question.	<input type="radio"/>	<input type="radio"/>

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Reading
<i>Text type</i>	Informative
<i>Process</i>	Integrate and interpret
<i>Context</i>	Further education and professional learning
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Understands texts incorporating some abstract ideas, symbolism and embedded information, in which the relationship between concepts and information is not explicit and requires inference and interpretation
<i>Correct response</i>	True, True, False

### Question 9

This literacy sample question is representative of the technical skills of writing (vocabulary) of candidates at Band 3: Clearly above the test standard. Candidates are required to identify synonyms for high-level words.

The underlined word in the sentence below is too difficult for the class's rules.

Arbitrate difficulties with other classmates.

Select a synonym from the list below to replace it.

- A. Report
- B. Avoid
- C. Agitate
- D. Mediate

The question addresses the following aspects of the literacy assessment framework:

<i>Literacy domain</i>	Technical skills of writing
<i>Technical skill of writing</i>	Word usage
<i>Context</i>	Schools and teaching
<i>Indicative ACSF Level</i>	5
<i>Relevant ACSF descriptor</i>	Understands and uses appropriate specialised vocabulary in a variety of situations, e.g. explanations, descriptions or arguments
<i>Correct response</i>	D

## Described proficiency bands for numeracy

The following descriptions reflect the main *content* and *processes* that are assessed in the numeracy component of the test. For numeracy, the *content* elements are number and algebra, measurement and geometry, and statistics and probability with a focus on number, measurement and statistics. The *process* elements are identifying mathematical information and meaning in activities and texts; using and applying mathematical knowledge and problem solving processes; and interpreting, evaluating, communicating and representing mathematics. An online calculator is available for 80 per cent of the questions.

Table 3: Band descriptions for Number and Algebra


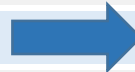
Number and Algebra	Band 1: Below the test standard	Band 2: At and above the test standard	Band 3: Clearly above the test standard
	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>• use whole numbers and some common fractions, decimals and percentages (such as <math>\frac{1}{8}</math>, 0.5, 10%) to solve one- or two-step routine problems, with or without a calculator</li> <li>• identify an appropriate formula (such as how to calculate an average in a spreadsheet) to solve problems in familiar contexts</li> </ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>• demonstrate the skills described in Band 1</li> <li>• identify and use the appropriate operation (+, −, ×, ÷) and use proportional reasoning, and a variety of fractions, decimals and percentages (such as <math>\frac{3}{5}</math>, 0.4, 85%) to solve multi-step problems in familiar situations, with or without a calculator</li> <li>• use a formula in familiar contexts to calculate a value</li> </ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>• demonstrate the skills described in Band 1 and Band 2</li> <li>• estimate and calculate accurately and use a variety of less familiar fractions, decimals and percentages (such as <math>\frac{1}{16}</math>, 9.93, 0.02%) to solve problems set in less routine contexts, with or without a calculator</li> <li>• use a graphical representation of an algebraic relationship (such as a linear graph) to calculate a value (such as a rate) in meaningful contexts</li> </ul>
	<p><b>Skills required to transition from Band 1 to Band 2</b> </p> <ul style="list-style-type: none"> <li>• calculate with a wider variety of fractions, decimals and percentages</li> <li>• solve problems of greater complexity (such as with more than two steps)</li> <li>• understand and use the formulae in real-world contexts</li> </ul>		
		<p><b>Skills required to transition from Band 2 to Band 3</b> </p> <ul style="list-style-type: none"> <li>• calculate with a wider variety and less familiar fractions, decimals and percentages</li> <li>• solve multi-step problems in less routine contexts</li> <li>• understand and use representations of formulae in less routine contexts</li> </ul>	



Table 4: Band descriptions for Measurement and Geometry





Measurement and Geometry	Band 1: Below the test standard	Band 2: At and above the test standard	Band 3: Clearly above the test standard
	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>interpret simple diagrams, read common scales, and use spatial skills such as interpretation of simple maps to identify a location or follow directions</li> <li>use routine timetables and calendars to calculate durations and identify times and dates</li> </ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>demonstrate the skills described in Band 1</li> <li>solve problems by applying knowledge and understanding of measurement concepts such as the speed-distance-time relationship</li> <li>apply spatial skills such as using scale to find distance, and reorienting maps and plans to determine directions and relative positions</li> <li>interpret and use schedules and time displays to determine durations and times, and to solve problems</li> </ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>demonstrate the skills described in Band 1 and Band 2</li> <li>link different information sources and apply measurement knowledge and understanding such as rates and area</li> <li>use spatial reasoning to interpret less routine maps and diagrams, and solve multi-step problems</li> <li>interpret and use time-related criteria such as schedules and regulations to solve multi-step problems</li> </ul>
	<b>Skills required to transition from Band 1 to Band 2</b> 		
	<ul style="list-style-type: none"> <li>understand and use rates and relationships (such as speed) to solve problems</li> <li>orient maps and use information such as scale to solve spatial problems</li> <li>use information on schedules and displays to accurately calculate durations</li> </ul>		
		<b>Skills required to transition from Band 2 to Band 3</b> 	
		<ul style="list-style-type: none"> <li>calculate area and volume using metric units in real-world contexts</li> <li>use ratio in relation to maps and plans to solve less routine spatial problems</li> <li>solve multi-step problems involving conversions between hours and minutes</li> </ul>	

Table 5: Band descriptions for Statistics and Probability

Statistics and Probability	Band 1: Below the test standard	Band 2: At and above the test standard	Band 3: Clearly above the test standard
	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>• interpret familiar data representations, evaluate some related statements and solve routine problems using the data</li> <li>• calculate everyday probabilities (such as 20%) in familiar contexts</li> </ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>• demonstrate the skills described in Band 1</li> <li>• interpret less familiar, relatively complex data representations (such as multi-category graphs and tables), evaluate related statements and solve routine problems using the data</li> <li>• calculate and interpret small probabilities (such as 0.3%) in meaningful contexts</li> </ul>	<p>Candidates can typically</p> <ul style="list-style-type: none"> <li>• demonstrate the skills described in Band 1 and Band 2</li> <li>• interpret additional data representations and diagrams (such as box-and-whisker plots and Venn diagrams) and use them to identify key aspects of the representations, evaluate related statements and solve more complex problems using the data</li> <li>• interpret written text containing statistical information and calculate a range of statistics (such as median and quartile)</li> <li>• calculate conditional probabilities in meaningful contexts</li> </ul>
	<b>Skills required to transition from Band 1 to Band 2</b> 		
	<ul style="list-style-type: none"> <li>• interpret a wider variety of more complex data displays and representations</li> <li>• understand, use and calculate probability in a wider variety of situations</li> </ul>		
	<b>Skills required to transition from Band 2 to Band 3</b> 		
	<ul style="list-style-type: none"> <li>• interpret more detailed statistical information and less routine data representations</li> <li>• understand and use a wider range of statistics</li> <li>• understand how probability can depend on given events and conditions</li> </ul>		

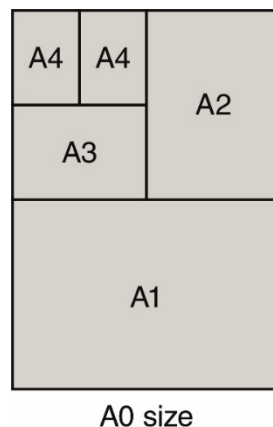
## Sample questions illustrating the numeracy band descriptions

### Band 1: Below the test standard

#### Question 1

This numeracy sample question is representative of the geometric problem-solving skills of candidates in Band 1: Below the test standard. The question requires candidates to see and use the relationship between the paper sizes in the diagram provided. The question requires interpretation of the diagram, some spatial reasoning and application of a counting strategy.

The diagram illustrates the relationship between an A0-size poster and other sizes.



What is the greatest number of A4-size posters that can be cut from an A0-size poster?

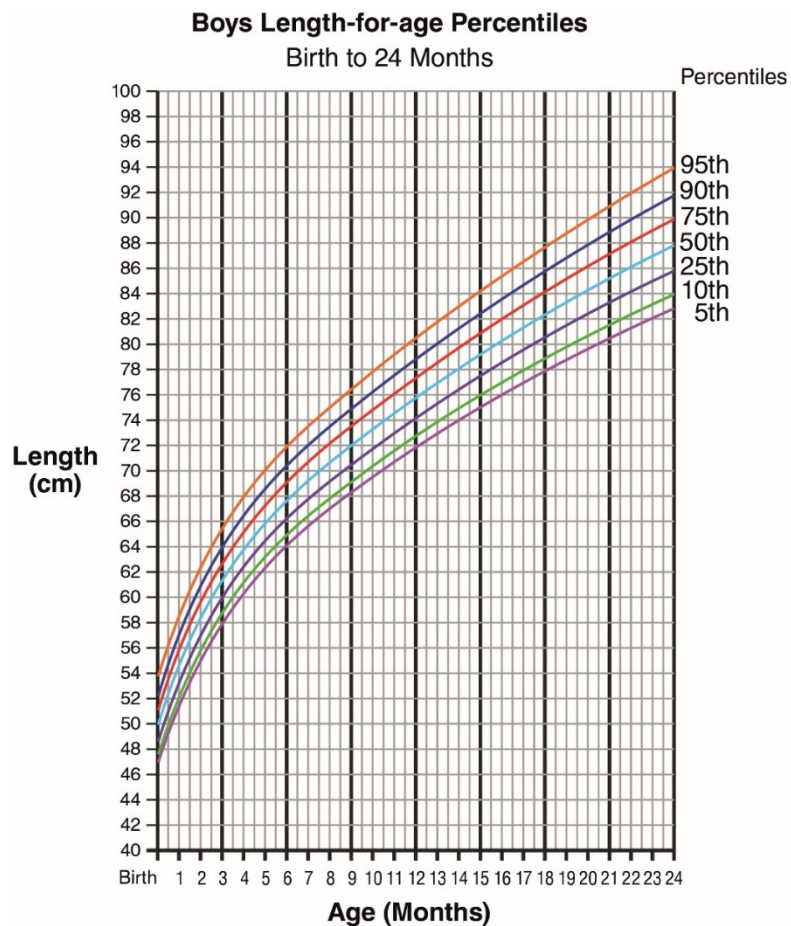
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<i>Content domain</i>	Measurement and Geometry
<i>Process domain</i>	Identifying mathematical information and meaning in activities and texts
<i>Context domain</i>	Personal and community
<i>Calculator availability</i>	Available
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Interprets and comprehends familiar and routine length, mass, volume/capacity, temperature and simple area measures
<i>Correct response</i>	16

## Question 2

This numeracy sample question is representative of the level of statistical interpretation and identification required by candidates in Band 1: Below the test standard. The question requires candidates to read and interpret a graphical representation of data. Reading between the marks on the scale of each axis is not required and only identification of the curve passing through the point corresponding to the given information is required.

This graph shows the length of boys from birth to 24 months by selected percentiles.



A boy is 74 cm long at 12 months.

His length is closest to which percentile?

- A. 50th
- B. 25th
- C. 10th
- D. 5th

<i>Content domain</i>	Statistics and Probability
<i>Process domain</i>	Identifying mathematical information and meaning in activities and texts
<i>Context domain</i>	Personal and community
<i>Calculator availability</i>	Available
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Selects and interprets mathematical information that may be partly embedded in a range of familiar, and some less familiar, tasks and texts
<i>Correct response</i>	B

### Question 3

This numeracy sample question is representative of the proportional reasoning skills using fractions of candidates at Band 1: Below the test standard. The question is set in a common everyday context and a calculator is not available. Candidates who interpret the question correctly can use number sense to rule out options A and B. It is likely that most candidates will be required to perform some calculation to discriminate between options C and D. The essential understanding is to determine that five halves is equivalent to two and a half.

A recipe for one batch of play dough is:

1 cup of salt

$\frac{1}{2}$  cup of water

$1\frac{1}{2}$  cups of flour

2 tablespoons of cooking oil

food colouring

How many cups of flour are needed for 5 batches of play dough?

A.  $3\frac{1}{2}$

B.  $5\frac{1}{2}$

C.  $6\frac{1}{2}$

D.  $7\frac{1}{2}$

<i>Content domain</i>	Number and Algebra
<i>Process domain</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context domain</i>	Personal and community
<i>Calculator availability</i>	Not available
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Calculates with whole numbers and everyday or routine fractions, decimals and percentages (includes dividing by small whole numbers only)
<i>Correct response</i>	D

## Band 2: At and above the test standard

### Question 4

This numeracy sample question is representative of the statistical knowledge, reasoning and interpretation skills of candidates in Band 2: At and above the test standard. For some candidates, box-plots and dot-plots may be less familiar representations of data. For this type of multiple-choice question, each of the statements must be interpreted correctly. The first two statements require interpretation of one representation at a time. The third statement requires both representations to be compared.

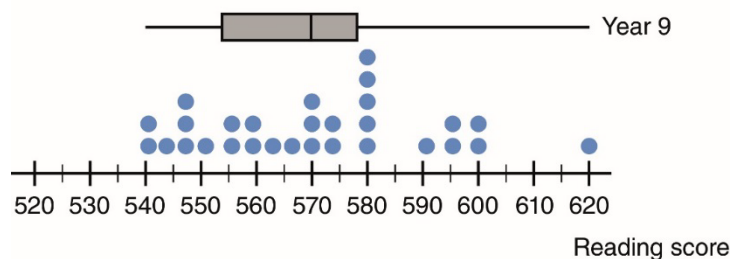
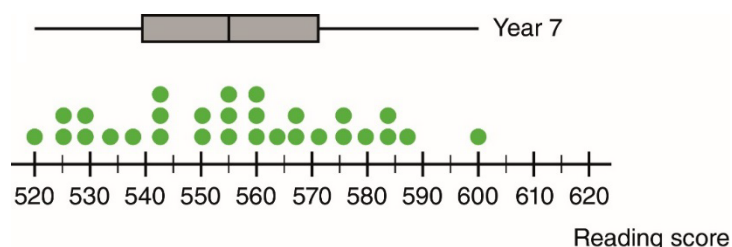
At a data interpretation workshop, teachers were given the following example.

In Year 7, a group of 29 students completed a reading test.

In Year 9, the same group of students completed a reading test from the same series.

The graphs below show their results.

Scores at Year 7 and Year 9 are reported on the same scale.



Below are some statements about the graphs.

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

Statement	True	False
The difference between the highest and lowest Year 7 reading scores was 120.	<input type="radio"/>	<input type="radio"/>
Six Year 9 scores were greater than 585.	<input type="radio"/>	<input type="radio"/>
There is at least one student whose reading score has increased by 20 or more from Year 7 to Year 9.	<input type="radio"/>	<input type="radio"/>

<i>Content domain</i>	Statistics and Probability
<i>Process domain</i>	Interpreting, evaluating, communicating and representing mathematics
<i>Context domain</i>	Further education and professional learning
<i>Calculator availability</i>	Available
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Extracts, interprets and comprehends statistical data in complex tables and spreadsheets, graphs, measures of central tendency, simple measures of spread and common chance events
<i>Correct response</i>	False, True, True



### Question 5

This numeracy sample question is representative of the algebra skills of candidates at Band 2: At and above the test standard. While some candidates may find the spreadsheet context unfamiliar, it is possible to use the information provided about spreadsheets to interpret the algebraic notation in the options. A concrete strategy is to imagine three quantities, model the total cost calculation and then determine which rule has the same structure as the calculation.

Mary's Garden Supplies uses a spreadsheet to find the total cost of an order.

The quantity of each material ordered is entered into cells B2, B4 and B6.

The spreadsheet then calculates the total cost in cell B10.

	A	B	C	D
1	Material	Quantity (cubic metres)	Cost per cubic metre (\$)	
2	sand		\$85	
3				
4	soil		\$45	
5				
6	tanbark		\$90	
7				
8				
9				
10	<b>TOTAL COST (\$)</b>			

#### About spreadsheets ...

Each cell is referred to by the column letter and row number.

For example 'soil' is in cell A4.

The symbol \* stands for multiplication

The symbol / stands for division

Which formula can be used to find the total cost in cell B10?

- A.  $=(B2 * C2) + (B4 * C4) + (B6 * C6)$
- B.  $=(B2 + C2) + (B4 + C4) + (B6 + C6)$
- C.  $=(B2 * C2) * (B4 * C4) * (B6 * C6)$
- D.  $=(B2 + B4 + B6) * (C2 + C4 + C6)$

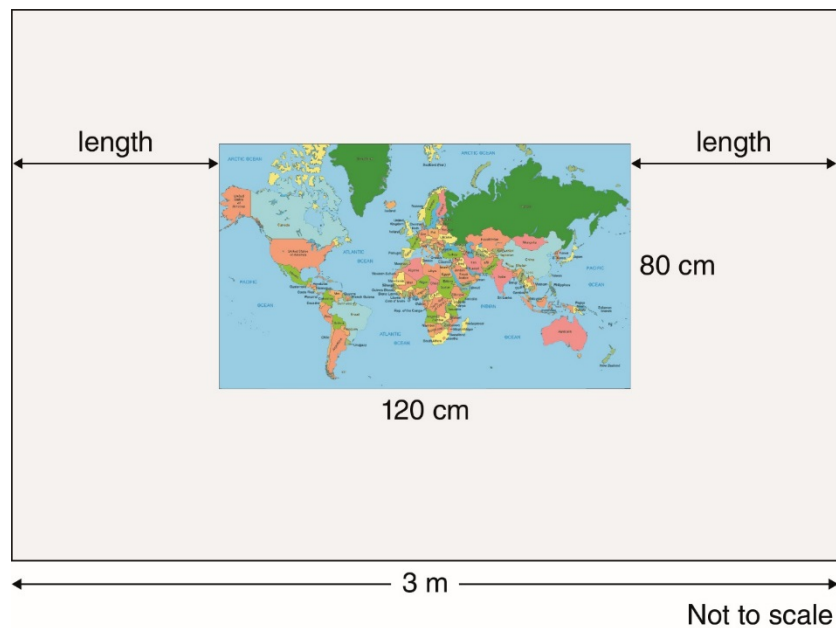
<i>Content domain</i>	Number and Algebra
<i>Process domain</i>	Interpreting, evaluating, communicating and representing mathematics
<i>Context domain</i>	Personal and community
<i>Calculator availability</i>	Available
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Uses a combination of informal, but mostly formal, written mathematical and general language, including some specialised mathematical symbolism, abbreviations, terminology and representations to document, interpret and communicate mathematically
<i>Correct response</i>	A

### Question 6

This numeracy sample question is representative of the problem-solving skills of candidates at Band 2: At and above the test standard. It is a multi-step measurement problem that requires metric conversion and formulation. The formulation involves the realisation that the length required is half the difference between 3 metres and 120 centimetres. It also involves the realisation that the mixed units requires conversion and the knowledge that one metre is equivalent to one hundred centimetres.

A teacher wants to place a map, with the dimensions shown, in the centre of a 3-metre wide display board.

The two distances marked 'length' on the diagram are to be equal.



How many centimetres should each length be?

\_\_\_\_\_ cm

<i>Content domain</i>	Measurement and Geometry
<i>Process domain</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context domain</i>	Schools and teaching
<i>Calculator availability</i>	Available
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Measures, estimates and calculates length, perimeter, mass, capacity/volume, time, temperature and simple area (for rectangular areas only) or estimates area of non-rectangular shapes
<i>Correct response</i>	90

### Question 7

This numeracy sample question is representative of the proportional reasoning skills of candidates at Band 2: At and above the test standard. It also illustrates their ability to check the answer for reasonableness within the given context. For example, in this case that a whole number response is required. The type of information provided is in the form of an informal ratio and such statements are common in educational and health and safety contexts. As such the context should be familiar to almost all candidates. A calculator is not available for this question.

In one state of Australia, an Education Department regulation advises that **two** asthma emergency kits should be provided for every 300 students, or part of 300 students.

A school has 530 students.

How many asthma emergency kits should be provided for the school?

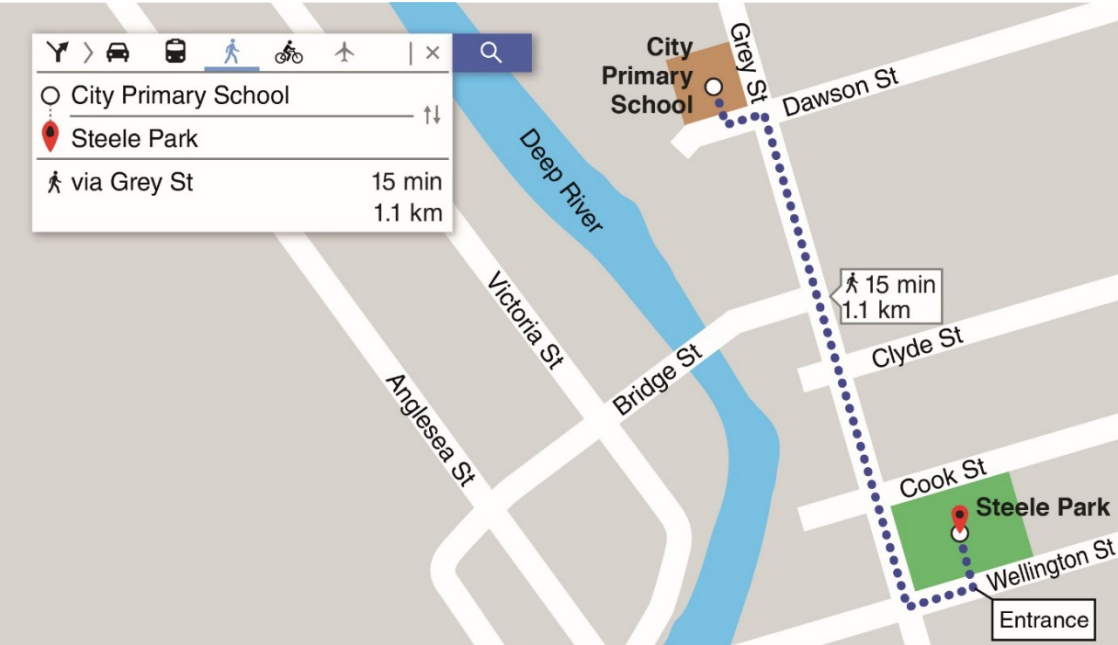
\_\_\_\_\_

<i>Content domain</i>	Number and Algebra
<i>Process domain</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context domain</i>	Schools and teaching
<i>Calculator availability</i>	Not available
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Uses and applies rates in familiar or routine situations
<i>Correct response</i>	4

Question 8

This numeracy sample question is representative of the spatial reasoning and map skills of candidates in Band 2: At and above the test standard. For this type of multiple-choice question, each of the statements must be interpreted correctly. Statements one and three require the ability to orientate oneself on the map. The second statement requires use of the distance information on the map, knowledge of metric conversion and estimation skills.

An online map shows this route from City Primary School to Steele Park, and related information.



Below are some statements about the map.  
Select 'True' or 'False' for each statement.

Statement	True	False
When walking from City Primary School towards Steele Park along Grey St, Bridge St is on the left.	<input type="radio"/>	<input type="radio"/>
The distance from the corner of Bridge St and Grey St to the entrance of Steele Park is less than 200 metres.	<input type="radio"/>	<input type="radio"/>
The route from City Primary School to Steele Park requires three left turns and one right turn.	<input type="radio"/>	<input type="radio"/>

<i>Content domain</i>	Measurement and Geometry
<i>Process domain</i>	Interpreting, evaluating, communicating and representing mathematics
<i>Context domain</i>	Personal and community
<i>Calculator availability</i>	Available
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Uses a combination of both formal and informal symbolism, diagrams, graphs and conventions relevant to the mathematical knowledge of the level.
<i>Correct response</i>	False, False, True

### Band 3: Clearly above the test standard

#### Question 9

This numeracy sample question is representative of the ability of candidates at Band 3: Clearly above the test standard to interpret and use financial information provided in a table. In order to answer the question correctly, the correct formulation must be selected using the information from multiple cells in the table. It is also necessary to know that calculating 90% is equivalent to a 10% reduction.

A school is planning a 10-day Central Australia trip for 33 students and 3 teachers. This table shows the charges and conditions.

10-day Central Australia Trip		
Cost per student	(35-40 students)	\$2750 per student (Full cost)
	(30-34 students)	\$3200 per student (Full cost)
Early Bird rate (If paid in full 30 days before departure date)		Save 10% of full cost
Deposit (Payable within 7 days of booking)		20% of full cost
Teachers (Up to 3 teachers)		Free

Using the Early Bird rate, which of these shows how to calculate the total payable to the bus company?

- A. 10% of  $33 \times \$3200$
- B. 10% of  $36 \times \$2750$
- C. 90% of  $33 \times \$2750$
- D. 90% of  $33 \times \$3200$
- E. 90% of  $36 \times \$2750$



<i>Content domain</i>	Number and Algebra
<i>Process domain</i>	Identifying mathematical information and meaning in activities and texts
<i>Context domain</i>	Schools and teaching
<i>Calculator availability</i>	Available
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Selects and interprets mathematical information that may be partly embedded in a range of familiar, and some less familiar, tasks and texts
<i>Correct response</i>	D

### Question 10

This numeracy sample question is representative of the level of personal numeracy of candidates at Band 3: Clearly above the test standard. It is a multi-step problem for which a calculator is not available. In order to provide a correct response, it is necessary to use the information in the table to calculate a duration in minutes, subtract the time intervals in the information provided below the table, and divide the remaining time by the number of games.

A games afternoon is organised at a school.

The students are divided into four groups: red, blue, green and yellow.

Each group rotates through four games as shown in the table.

	Red	Blue	Green	Yellow
<b>Start 1:30 pm</b>	Game 1	Game 2	Game 3	Game 4
<b>Break</b>				
	Game 2	Game 3	Game 4	Game 1
<b>Break</b>				
	Game 3	Game 4	Game 1	Game 2
<b>Break</b>				
	Game 4	Game 1	Game 2	Game 3
<b>Presentations</b>				
<b>End 3:15 pm</b>				

There is a 5-minute break between each game and 10 minutes are allocated for presentations.

How many minutes are allocated for each game?

\_\_\_\_\_ minutes

<i>Content domain</i>	Measurement and Geometry
<i>Process domain</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context domain</i>	Schools and teaching
<i>Calculator availability</i>	Not available
<i>Indicative ACSF Level</i>	3
<i>Relevant ACSF descriptor</i>	Measures, estimates and calculates length, perimeter, mass, capacity/volume, time, temperature and simple area. Selects from and uses a variety of developing mathematical and problem solving strategies in a range of familiar and some less familiar contexts
<i>Correct response</i>	20

### Question 11

This numeracy sample question is representative of the statistical knowledge and understanding of candidates at Band 3: Clearly above the test standard. It is the second question relating to the same text as sample question 4 in Band 2. For some candidates, box-plots and dot-plots may be less familiar representations of data. In order to provide a correct response, two strategies are possible. One is to use each dot-plot to determine each middle value. The other is to use the median line in each box-plot to read each median off the scale. The last step is to subtract the median values to find the difference.

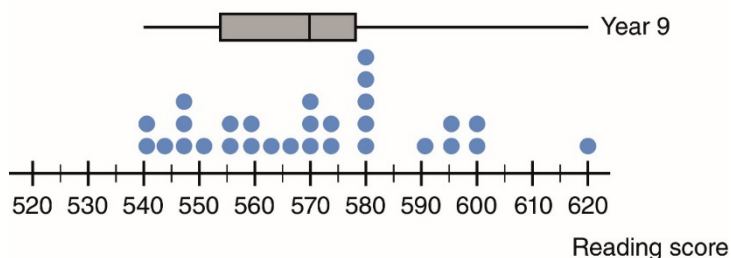
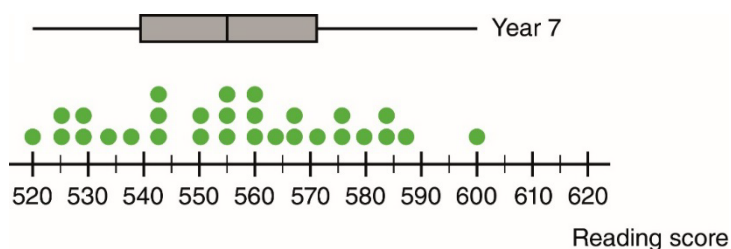
At a data interpretation workshop, teachers were given the following example.

In Year 7, a group of 29 students completed a reading test.

In Year 9, the same group of students completed a reading test from the same series.

The graphs below show their results.

Scores at Year 7 and Year 9 are reported on the same scale.



What is the difference between the median (middle) reading scores of Year 7 and Year 9?

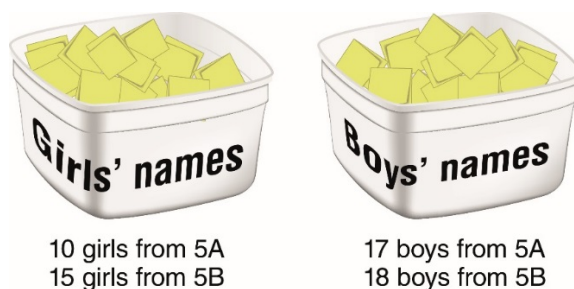
\_\_\_\_\_

<i>Content domain</i>	Statistics and Probability
<i>Process domain</i>	Identifying mathematical information and meaning in activities and texts
<i>Context domain</i>	Further education and professional learning
<i>Calculator availability</i>	Available
<i>Indicative ACSF Level</i>	4
<i>Relevant ACSF descriptor</i>	Extracts, interprets and comprehends statistical data in complex tables and spreadsheets, graphs, measures of central tendency, simple measures of spread and common chance events
<i>Correct response</i>	15

## Question 12

This numeracy sample question is representative of the understanding of probability of candidates in Band 3: Clearly above the test standard. In order to provide a correct response, it is necessary to realise that the probability is dependent upon the given condition, that a girl is selected. The fraction obtained must then be expressed as a percentage.

Two Year 5 students, one girl and one boy, are to be randomly selected to read at an assembly. There are two Year 5 classes, 5A and 5B. The girls' names and the boys' names are placed into separate containers. The numbers of girls and the numbers of boys from each class are shown.



A girl is selected.

What is the chance that the selected girl is from class 5A?

Express your answer as a percentage.

\_\_\_\_\_ %

*Content domain*

Statistics and Probability

*Process domain*

Using and applying mathematical knowledge and problem solving processes

*Context domain*

Schools and teaching

*Calculator availability*

Available

*Indicative ACSF Level*

4

*Relevant ACSF descriptor*

Uses knowledge about chance and probability to estimate and interpret the outcomes of common chance events in both numerical and qualitative terms

*Correct response*

40

## Appendix

### Reading Success Test

A teacher has administered a Reading Success Comprehension Test to her class.

Section 1 below is an extract from the printed report of the results from the class. Section 2 is a list of terms relating to the extract.

#### SECTION 1

		Each Reading Success Comprehension Test contains short texts of different text types. Each text has a set of questions; the text and questions together form a unit.													
Question Difficulty		80	85	86	93	91	84	87	128	92	91	103	107	105	104
Question Type		RI	IE	II	RF	II	RI	IE	RF	IE	RI	RI	II	RF	IE
Unit Name		Oceans	Oceans	Oceans	Oceans	Hidden Messages	Hidden Messages	Hidden Messages	Opening The Box	Opening The Box	Opening The Box	Making Pies	Making Pies	Making Pies	Making Pies
Question Number		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Correct Answer		D	D	B	D	D	A	C	C	B	C	C	A	B	D
Surname	First Name														
Aarons	George	D	C	B	D	C	A	B	A	C	D	A	B	D	C
Benice	Elaine	D	D	B	D	D	A	C	C	D	C	C	M	M	M
Biggins	Owen	D	D	B	B	D	A	C	A	B	C	C	C	A	D
Cook	Jacob	D	A	B	D	D	A	A	A	C	A	A	C	C	A
Ghanem	Hind	D	D	B	D	D	A	C	C	B	C	C	B	B	D
Jara	Jasper	D	D	B	D	D	A	C	A	A	C	D	D	B	B
Kissel	Matthew	D	D	D	D	D	A	A	B	C	B	D	B	D	D
Lee	Hind	D	D	B	D	D	A	C	C	B	C	B	C	A	A
Martinez	Nicolas	D	C	B	D	D	A	B	C	C	C	A	B	B	A
Smither	Talia	D	C	B	D	D	A	C	C	A	C	B	C	B	C
Sabson	Marina	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Salinas	Philip	D	D	B	D	D	A	C	C	B	C	C	A	B	D
Vong	Julianne	D	A	B	D	D	B	C	M	C	C	M	M	M	M
Woods	Kristy	C	D	C	B	D	C	C	A	C	C	C	B	A	D
Williams	Henry	D	D	B	D	A	B	C	A	D	C	C	B	C	C
Wu	Rachel	D	A	D	A	B	A	B	A	A	C	A	C	C	C

#### SECTION 2

##### An explanation of terms from the Reading Success Comprehension Test report

1. **Question Difficulty.** Higher numbers indicate more challenging questions based on responses from 2000 students in a norm study.
2. **Question Type.** Questions are categorised into areas of reading comprehension: IE (Interpreting explicit information), II (Interpreting by making inferences), RF (Reflecting on texts) and RI (Retrieving information).
3. **Correct Answers.** The correct answer (a letter response: A, B, C or D) is given immediately below the Question Number for each question.
4. **Students' Responses.** The spreadsheet indicates each student's response. Incorrect responses are shaded light grey. Missing answers, where students did not give any response, are marked with an M and shaded dark grey.



## Homework

*This is a draft text for a homework task.*

In this task you will be using your maths skills to make a shape.

1. Get some thin cardboard from home (cereal boxes are good) or the paper recycling unit at school.
2. You will make three solid shapes out of cardboard and sticky tape, with the following volumes: 9, 24 and 154 cubic centimetres.
3. You will apply your knowledge of numbers, measurement and nets to construct some solids.
4. Hand in your calculations, the net design with the dimensions, and the three solids by the end of next week.
5. Put everything together in a sealed, named bag.
6. Make sure you have scissors, sticky tape and cardboard to make your shapes.

### *Letter From Hanoi*

*This is a personal letter from the Australian International Academic Director of a large bilingual school in Hanoi, Vietnam.*

Today was our Christmas celebration at school, ending the term with a two-week gap before the students commence their Term 3 studies. Christmas is not a traditional celebration for the Vietnamese, yet they embrace it wholeheartedly. Many of the students turn up in Santa suits themselves. I find myself wanting to say, 'This is all wrong,' as though I have some superior right or knowledge to dictate how Christmas ought to be celebrated.

We help our Santa (a burly New Zealand teacher) to get ready in the office. The Vietnamese Santa suit is a very flimsy affair and we use several safety pins and extra cotton wool to beef up the whole effect. It's a tight squeeze in the Asian-sized suit but he doesn't worry too much about showing a bit of ankle and wrist. Santa and the science teacher, a six-foot-tall Irish elf dressed entirely in green and armed with a lolly bag, set off around the school on a motorbike, beeping madly so the students will come to the windows. The teachers are excited and encourage the children to chase the bike. Santa and the elf are afraid to stop, followed as they are by a mob of about 400 running, squealing children. My mind is reeling with the health and safety implications of wholesale, lawless chaos.

I shouldn't really have worried. Here the children kick a ball on the roof and calmly go and borrow a ladder from the janitor or climb out a window to retrieve it, much to my Westerner's anguish. To my knowledge, there has been no ambulance summons or serious injury in the two years I've been here.

Order is eventually restored and Santa and his elf dismount from their bike to visit each classroom, distribute candy and have photos taken. The children seem a little confused about asking for presents from this man called Santa. They usually receive 'lucky money' at Lunar New Year or on their birthdays, but all the same they are happy to go along with the big 'Ho-ho-ho-ing' guy in the red suit who says he's going to visit their house quite soon.

The only glitch in the day really comes when the preschool teachers insist Santa wake the kindergarteners from their lunchtime sleep. I desperately want to intervene, but restrain myself. Predictably, there are tears and howls of terror from four-year-olds woken from a peaceful snooze by a massive, bearded stranger leaning over their cots. Santa and his elf are definitely traumatised by the whole event. The staff giggle and shhhhh, beaming tolerantly as they usher their sobbing charges into position for the inevitable group photograph. Later in the day, these children are exultant about their tearful Santa photo. My overprotective Western thinking has been challenged yet again.

There is a performance in the afternoon. Christmas songs are performed with gusto, not only by the children, but by the Vietnamese teachers of each sector of the school, who dress up in cute, specially made red and white costumes and compete vigorously with each other for cash prizes. Our international teachers slink away to the back of the crowd; I wish they could let go of their cultural inhibitions and get more involved.

Singing is big here. I was invited to sing at the opening of the first board meeting of the school year where we sipped red wine at 10 am and ate fruit to celebrate. Not wanting to offend, I reluctantly responded with a rather shaky, unaccompanied rendition of 'You are my sunshine' to serious-faced executives who solemnly clapped and nodded their appreciation.

For this Christmas occasion I am required to make a speech, which is translated by the young assistant at my side. It doesn't matter really: no one is listening; no one ever does listen to speeches from anybody. It is the formality that is important. The audience talk and call out to each other throughout

and the speakers speak on regardless. It took me a while to understand this. A Vietnamese explained to me once: 'We Vietnamese are very good at multi-tasking.'

The elf delivers a fine performance of 'Jingle bells' to uproarious applause. I think again, as I have so many times before, how lucky I am to share the sheer fun that the Vietnamese seem to wring out of every occasion.