

NAPLAN

2019 State report — Year 3

March 2020

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Preface

State reports are issued by the QCAA about the performance of Queensland students on the National Assessment Program — Literacy and Numeracy (NAPLAN) paper tests. State reports provide system-level information and are publicly available. This report for Year 3 students in 2019 contains:

- the Queensland performance on each item
- the national performance on each item
- the item descriptors
- a commentary on the state results
- recommendations for teaching.

Who should use this State report?

The NAPLAN State reports help principals, teachers and other school personnel understand, interpret and use information about student performance on NAPLAN.

School principals can use this report to provide information to the school community on aspects of the tests. This would allow professional conversations with their teachers, curriculum leaders, and department heads. Curriculum leaders can use this information to interpret the more specific information given in their school and class reports.

Since this report is publicly available on the QCAA website, it can also inform providers of teacher training, special education services and educational research and policy.

Parents and carers can use this report to interpret the results on their child's student report. They are also able to judge how their child performed when compared with state and national results. The item descriptors also provide useful information about the scope of the tests.

About the tests

The purpose of the National Assessment Program (NAP) is to collect information that governments, education authorities and schools can use to identify indicative literacy and numeracy skills Australian students can demonstrate. As part of that program, the NAPLAN tests are administered to full cohorts of students in Years 3, 5, 7 and 9 each year. These standardised tests are sources of information about student learning that can be used to inform educational policy and current educational practice.

The NAPLAN tests were initially developed using the nationally agreed Statements of Learning for English and Statements of Learning for Mathematics, 2005. Since 2016, the tests are referenced to the Australian Curriculum. The NAPLAN tests are designed to assess student understanding in the following areas:

- reading: assessing the ability of students to independently make meaning from written Standard Australian English texts, including those with some visual elements
- writing: assessing the ability of students to convey thoughts, ideas and information through the independent construction of a written text in Standard Australian English
- language conventions: assessing the ability of students to independently recognise and use correct Standard Australian English grammar, punctuation and spelling
- numeracy: assessing students' knowledge of mathematics, their ability to independently apply that knowledge in context, and their ability to reason mathematically.

Marking and scoring the tests

Marking the tests

Test items that are not presented in a multiple-choice format require a constructed response by students. These responses are checked by trained markers that apply nationally agreed upon marking guides. The marking guides allow for consistent and reliable judgments to be made in Queensland and across all states and territories. There is a rubric for marking the Writing test and marking guides specific to Numeracy and Spelling.

Calculating raw scores

The simplest calculation made in scoring the tests is the raw score — the number of questions answered correctly. All the questions for the Language conventions, Reading and Numeracy tests are marked as either correct or incorrect. Raw scores for the Writing test are the sum of the marks for each of the ten criteria.

Raw scores have limited use and need to be considered as broadly indicative of performance. They enable the performance of students who have all completed the same test at the same time to be placed in a rank order, but they do not provide information about the level of difficulty of the test nor the relative differences between students.

Constructing scaled scores and bands

To make raw scores more useful, they are converted to scores on a common scale that reflects how difficult it was to achieve each score. Each year ACARA publishes equivalence tables that allow a student's raw score to be located on the NAPLAN scale. The scale is comparable between year levels for each assessment domain. An equating process is also carried out on each year's test to enable scaled scores to be compared between different years of testing. For example, a raw score of 20 on the Year 3 Reading test might be translated to a scaled score of 425. This also represents the same level of achievement for a Year 5 student with the same scaled score of 425. This also represents the same level of achievement level for a student achieving a scaled score of 425 for a Reading test in a previous year of NAPLAN assessment.

Each NAPLAN scale is divided into ten [bands](#) used to report student progress.

Using NAPLAN reports to inform teaching and learning

Using scaled scores

The scaled score can compare the results of different students. Scaled scores provide a basis for measuring and comparing students' abilities across years of schooling, for example, comparing a student's result in Year 3 in 2017 and Year 5 in 2019. The scales can help to monitor the growth of groups of students over time.

Principals and teachers should take care when making comparisons between small groups of students. For groups of less than 10 students, differences may not be reliable, particularly when those differences are small.

Using item analysis

While the national and state reports provide comparative data, class reports provide a school with additional information that can be used to inform teaching and learning and build capacity in schools. Analysis of NAPLAN class data, in particular the performance on individual items, will provide teachers with information about the understandings and misconceptions of their students.

Looking at the performance on the items and then analysing the error patterns allows teachers and principals to make hypotheses about why groups of students make particular errors.

Steps for analysis might be as follows:

1. Compare the facility rates (percentage correct) achieved by the school's students with the national and state results available in this document. Are there observable differences in performance?
2. Look at the common errors made by their students and compare them with the common errors made in the state. Only errors from Queensland students are available and can be found in the item analyses accessible through [SunLANDA Online](#).
3. Form hypotheses about why students are making these errors, e.g.
 - How did students think about this aspect of the curriculum?
 - What misunderstandings might these errors represent?
 - How might the structure of the test question have shaped the response?

Using a combination of NAPLAN data, school-based assessments and professional judgment, teachers may then test these hypotheses to see whether they are valid or whether there is more to be considered and investigated. Teachers can then plan lessons related to the specific areas where students have been identified as needing assistance. Teachers can also make judgments about teaching approaches and curriculum.

The professional conversations that are part of this process are an effective and powerful way to use NAPLAN data, as they provide a vehicle for developing shared understandings.

Placing the tests in the assessment context

The results from NAPLAN tests should be recognised as only one factor providing insight into a school's assessment program. Various forms of assessment are needed to inform the different stages of the teaching and learning cycle. Principals and teachers should keep in mind that NAPLAN is a point-in-time, timed test that can only cover a limited number of curriculum skills and areas.

The results from a school's own assessments of student performance should be consistent with the NAPLAN results. If the NAPLAN results are different from what was expected, consider possible reasons. The results of the tests may indicate aspects of student performance that need further investigation within the classroom, using other forms of assessment.

An item with a low facility rate (percentage correct) may not necessarily indicate a problem in teaching and learning. It may be that this was simply a difficult item for all students in this cohort across Australia.

Other NAPLAN reports

In addition to the State reports, the following reports are produced about the performance of Queensland students who sit the NAPLAN paper tests.

SunLANDA Online

Student data is released on the QCAA Portal through the SunLANDA Online interface. Access to SunLANDA as application software is also available on the QCAA website.

SunLANDA Online provides class and school information in an electronic form that permits customised spreadsheet generation by users. In addition, it shows representative samples of students' incorrect responses to constructed responses where applicable. Hyperlinks from within SunLANDA Online lead to the QCAA's test item analysis. Information on how to use this service is available at:

www.qcaa.qld.edu.au/p-10/naplan/test-reporting-analysis/sunlanda/accessing-navigating-sunlanda

Test item analysis

These PDF documents contain an analysis of each test item. They can be downloaded directly from the QCAA website: www.qcaa.qld.edu.au/p-10/naplan/test-reporting-analysis/test-item-analysis

The analysis reproduces each item followed by expert analyses of how the item operated. It shows the distractors presented in multiple-choice items and explains students' reasoning.

School and class reports

The NAPLAN school and class reports are supplied electronically through the secure section of the QCAA website. These reports are accessible only with the school's Brief Identification Code (BIC) login and password. Individual student reports are distributed to schools as printed copies.

School reports

The QCAA issues NAPLAN school reports giving information about each school's performance. They provide a summary of year-level performance as well as performance by gender, language background and Indigenous status in the following fields:

- distribution of scaled scores
- distribution of achievement bands
- school and state means
- participation of the group.

The school report positions a school's performance within the state on a graph that is shaded to show the range of performance for the middle 60% of Queensland students together with the state mean.

Class reports

The QCAA issues NAPLAN class reports that show the performance of every student on every item. Under the name of each student is recorded the items they had correct and incorrect. They also show students' responses to constructed-response items.

The class report also gives the:

- percentage correct for each item for the class and state, and by gender
- scaled scores for each student
- performance bands for each student.

Individual student reports

The QCAA issues individual student reports to schools after the tests. Schools receive one printed report for each student to distribute to parents/carers.

ACARA reports

As well as the Queensland reports from the QCAA, national reports are available from the website of the Australian Curriculum Assessment and Reporting Authority (ACARA). The *NAPLAN National Summary Report* and the *NAPLAN National Report* allow states and territories to place the achievement of their students in relation to their peers across the nation. This is system-level information and is publicly available.

Literacy

Writing

Writing stimulus (Years 3 and 5)

YEAR 3 AND YEAR 5

The gate

Write a narrative (story) that involves a gate.
Who or what is on the other side of the gate?
Is the gate open or closed?

Perhaps opening or getting past the gate leads your characters to something exciting or difficult.

You can use an idea on this page, or you can use your own idea about a gate.

Think about:

- the characters and where they are
- the complication or problem to be solved
- how the story will end.

Remember to:

- plan your story before you start
- choose your words carefully
- write in sentences
- pay attention to your spelling, punctuation and paragraphs
- check and edit your writing.



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About the task

In 2019, the NAPLAN Writing test was based on the narrative genre. As was the case in 2018, the NAPLAN tests were delivered in both online and paper modes, although all Year 3 online students did the Writing test on paper responding to Writing stimulus: *The gate*. The test conditions and administration remained the same as in the previous year. Teachers delivered the spoken instructions and read the text on the stimulus aloud to the students and no discussion of the task was allowed. Working independently, students had to plan, compose and edit a written response for the Writing stimulus. They were given five minutes to plan, thirty minutes to write their script and five minutes to edit and complete their writing. All Year 3 students had to sit the Writing test on Day 1, Tuesday 14 May using Writing stimulus: *The gate*.

Each stimulus contained images, or students could use their own ideas if they complied with the topic. The 2019 NAPLAN Writing task required students to respond to the topic by composing a story within the narrative genre. Structural clues were provided on each stimulus about the orientation of characters and place, the need for complication/s and some resolution to the narrative. Students were advised that a complication may be more broadly interpreted than simply a problem — it drives the story.

The task instructions defined the expected structure of the story. This was to introduce the characters and where they were, describe the complication or problem to be solved, and provide a resolution. Students who wrote in other genres, such as persuasion, did not meet the text structure requirements and therefore scored a zero in the **text structure** criterion.

Marker training

Writing test markers were trained using the national narrative writing marker training package, delivered as part of ACARA's national assessment program. Markers were recruited and trained in accordance with national protocols. Registered teachers marked the NAPLAN Writing test in Queensland. All markers applied the ten criteria and related standards from the marking rubric. Writing test scripts were marked on screen in all states and territories.

Stringent quality control measures were applied to the marking of student scripts. This included a prescribed percentage of scripts required to be double marked, and the daily application nationally of control scripts for all markers. As part of the 2019 Queensland marking operation, referee marking was used to ensure high standards and marking consistency. This involved members of the NAPLAN team and the QCAA data team working together to develop a range of predicted scores for each year level. Any scripts that fell above or below the expected level were automatically referred to a high-level team of markers for cross-checking. Scores of zero in certain criteria were also referred for checking through this system.

Marking criteria

The following table outlines the 10 marking criteria and range of scores for the Writing task.

Table 1: Writing task marking criteria

Marking criterion	Description of narrative writing marking criterion	Possible scores
audience	the writer's capacity to orient, engage and affect the reader	0–6
text structure	the organisation of narrative features including orientation, complication and resolution into an appropriate and effective text structure	0–4
ideas	the creation, selection and crafting of ideas for a narrative	0–5
character and setting	character: the portrayal and development of character setting: the development of a sense of place, time and atmosphere	0–4
vocabulary	the range and precision of contextually appropriate language choices	0–5
cohesion	the control of multiple threads and relationships across the text, achieved through the use of grammatical elements (referring words, text connectives, conjunctions) and lexical elements (substitutions, repetitions, word associations)	0–4
paragraphing	the segmenting of text into paragraphs that assists the reader to negotiate the narrative	0–2
sentence structure	the production of grammatically correct, structurally sound and meaningful sentences	0–6
punctuation	the use of correct and appropriate punctuation to aid the reading of the text	0–5
spelling	the accuracy of spelling and the difficulty of the words used	0–6

Adapted from *Narrative Writing Marking Guide* (NAPLAN, 2010, www.nap.edu.au/naplan/writing); Note: the Narrative Writing Marking Guide remains unchanged for subsequent years.

Performance

Anecdotal evidence from markers indicated that students in Year 3 were comfortable with the writing stimulus: *The gate*, which featured six images. Of these images, the most widely adopted by students as a basis for their narratives were depictions of a rocket, a farm, an amusement park and a zoo. In previous years, when multiple images were displayed on a stimulus, there was a trend for students to do a tour of the stimulus — writing about each of the images in turn. This year only a minority of students did this. Students who diverged from the images provided tended to write more challenging and engaging narratives.

Many students at this year level adopted fairly straightforward recounts of events, or where complications did exist, they were often not substantial — the complications did not drive the narrative forward with any degree of potency. The openness of the topic did lead the characters to many different gates and their subsequent adventures within. The majority of conclusions had a happy ending where issues with the gate were resolved in a positive way.

Student responses tended to be slightly longer than the responses to the persuasive writing tasks of the previous two years. While this was encouraging, markers felt that many scripts could have been tighter and that students needed to develop greater precision in vocabulary. The students who were able to make use of a well-chosen adverb, adjective or nominal group could write using fewer words, but with more demonstrable control of language when providing information about their characters and settings.

The majority of Year 3 students wrote in straightforward sentence forms, with compound sentences used frequently. The overuse of *and* or *and then* is very common with this age group when writing narratives, which often detracts from student performance. The NAPLAN Narrative Writing test rubric rewards complexity of sentence form, while also recognising that simple sentences can be used for effect. In the highest scoring sentences in the **sentence structure** criterion, markers look for writing that contains controlled and well-developed sentences that express precise meaning and are consistently effective. The student must *show control over a range of different structures (quantity, quality and variety of lengths and beginnings)* (NAPLAN 2010, p. 13). When a student uses controlled and effective sentences demonstrating a range of sentence lengths and structures, their story will generally be enhanced. The following is an example of student writing that uses a range of sentence lengths and structures.

It was night time and Aria was about to go to sleep until she had the thought that she will never see her parents ever again. Aria was startled and traumatised. She was shocked by the feeling that she will never get inside, and with that Aria cried herself to sleep with that mean but true feeling inside of her. In the morning she thought to herself, I need to go past that gate, no matter how long it takes.

Students should be encouraged to explore the range of sentence structures, but also be advised that one advantage of including complex sentences with adverbial and adjectival clause structures is that it allows the student to expand on story elements through more detailed description. Additionally, thematic positioning of an adverbial clause can shift the direction of a story naturally and authentically.

Effective use of conjunctions and text connectives strengthen the cohesive structure of the narrative. When looking at the cohesive structure, markers are looking for *the control of multiple threads and relationships over the whole text, achieved through the use of referring words, substitutions, word associations and text connectives* (NAPLAN 2010, p. 4).

Sample script

Laura and Billy Adams were sailing through the clouds in the sky-scraper rollercoaster of Madison Amusement Park. They had the time of their lives as they soared higher than the birds, screaming for joy. They were down in the dumps when the ride was over, but the sight before them cheered them up. It was a large, charcoal-black gate, looking somehow brand-new, but also centuries old. A mythical gate, lying untouched, ready for someone to open it. "Let's see what's behind that gate!" called Billy, but Laura was already sprinting over.

CREAK! The gate was rustier than what Laura had imagined. Its sleek, black look was only a cover-a-prompt to get people to go through. Billy and Laura didn't realise this as they cautiously walked through the gate. "WOAH!" Laura exclaimed

as they walked through, "This IS a problem!" They had walked straight into a strange purple land. Billy shook his head as if to say, I don't like this place. But as they returned through the gate, they remained in the weird, different world of purpleness. "We're trapped!" said Billy.

The siblings spent five minutes deciding what to do, concluding with finding another gate. The search was crazy, but eventually they found a crimson gate. Laura nodded, as if to say let's go through. As they did, they returned to the amusement park. The two cheered for joy that they were out of that troublesome world.

That evening, as Billy and Laura

lay upon their beds, they remembered how worried they felt only a few hours ago. They decided that their lesson was to never go through unknown gates again. "Hey, Billy," said Laura, "I never want to have any other way of adventure again." And Billy's reply was, "same!"

END OF TEST

Commentary on sample script

The Year 3 sample script is based on the writing stimulus: *The gate*. It was not given a title by the student, but the script orients the reader and provides sufficient information for a reader to follow easily. It is a well-written story by a younger student and it traces the adventures of Laura and Billy and their adventures at an amusement park. Following an exciting ride, they see *A mythical gate, lying untouched, ready for someone to open it*. The complication develops once they enter the gate and the student clearly explains the problem the siblings' face. The author uses speech to convey the protagonists' thoughts and fears and their relief when the problem is solved and they return home. The context of the narrative is well established, and the audience is engaged throughout the story. The student scored four for the **audience** criterion, out of a maximum of six. This is an excellent score for a Year 3 student, considering that the rubric is consistently applied to scripts for students across all four NAPLAN year levels.

The script effectively organises the ideas into the three identifiable components of a narrative text — introduction, complication and resolution — to score three out of four in the **text structure** criterion. The student has produced a coherent and complete narrative and the reader is engaged in the story. It has a somewhat abrupt finish where the complication is resolved in a basic but plausible manner and the two characters reflect on their adventures.

The maximum score for the **ideas** criterion is five and this script was awarded four. The ideas in the story are elaborated and contribute effectively to the central storyline. They are crafted to create suspense and tension before concluding with a reflection about the lessons learnt. The text did not stretch into the area of theme (an unlikely attribute of Year 3 writing) but it had a clear narrative structure with a central idea.

The story contains effective characterisation, which emerges through descriptions, actions and speech as well as the attribution of thought and feelings of the two characters. The amusement park setting is introduced in the orientation and the story moves on to the discovery and entering of a gate:

They had walked straight into a strange purple land. Billy shook his head as if to say, I don't like this place. But as they returned through the gate, they remained in the weird, different world of purpleness. 'We're trapped!' said Billy.

A score of three out of a possible four was awarded for the **character and setting** criterion.

The student scored three out of a possible five for the **vocabulary** criterion because their script has four or more *precise words or word groups* (NAPLAN 2010, p. 10), including:

screaming for joy; centuries; mythical gate; untouched; sprinting; imagined; sleek, black look; cautiously walked; exclaimed; siblings; concluding; troublesome world

Precise words and phrases are used throughout the narrative in a natural and articulate manner to enhance the story. This Year 3 student is to be congratulated on their efforts to use such precise and interesting words to make the reader highly engaged with the narrative.

As well as displaying excellent skills with vocabulary usage, this student demonstrates that they are a capable speller. They correctly spell all simple and common words as well as more than 10 difficult words. They achieved a score of five, out of a possible six, for the **spelling** criterion which represents an excellent result for a Year 3 student.

When reading this script, the meaning is clear and the text flows well in a sustained piece of writing. Cohesive devices are used correctly to support reader understanding and the reader does not need to re-read to fill in gaps. The student demonstrates the accurate use of referring words and controls the narrative tense. This script was awarded three for the **cohesion** criterion. It was considered that sections of the text were not as tightly linked as required to achieve the maximum score of four.

This student scored a four out of a possible six in the **sentence structure** criterion. The sentences are correct but do not show the variety and sophistication needed for a higher score. There is some variety in form and length as can be seen at the start of the second paragraph:

CREAK! The gate was rustier than what Laura had imagined. Its sleek, black look was only a cover, a prompt to get people to go through. Billy and Laura didn't realise this as they cautiously walked through the gate.

Punctuation, too, was generally accurate, including examples of correct use of direct speech, commas, apostrophes of contraction and ownership, and capital letters for proper nouns. Two words written in capital letters — *CREAK* and *WOAH* (paragraph two), used for effect and, therefore, not considered to be *stray capitals* (NAPLAN 2010, p. 14). The student achieved a score of four out of a possible five in this criterion.

When marking narrative writing, the **paragraph** criterion has a maximum of two points, unlike the persuasive writing, where the maximum is three points. This student was awarded one point. Their writing was organised into paragraphs that are mainly focused on a single idea or set of similar ideas that assist the reader to digest the chunks of text. The breaks indicate broad changes in time and scene; however, a more experienced student might have tightened the paragraphs to deliberately structure the pace and direct the reader's attention in a more controlled manner.

Overall, the student has produced an entertaining story, and demonstrates a very high level of writing skills and knowledge for a Year 3 student.

Language conventions — Spelling

Results and item descriptions

The percentage columns give the facility rate (percentage correct).

Table 2: Language conventions — Spelling results and item descriptions

Item	Answer	Error	Qld %	National %	ACARA item description
Proofreading — Error identified					
1	spin	spinn	91.15	92.20	correctly spells a one-syllable word with <i>-n</i>
2	kicked	kickd	78.39	81.88	correctly spells a one-syllable word with <i>-ed</i>
3	follow	follo	69.83	74.50	correctly spells a two-syllable word with <i>-ow</i>
4	people	peeple	66.21	70.76	correctly spells a two-syllable word with <i>-eo-</i>
5	bigger	bigga	63.59	67.10	correctly spells a two-syllable word with <i>-er</i>
6	anyway	enyway	67.50	71.36	correctly spells a three-syllable word with <i>a-</i>
7	rule	rool	51.94	56.86	correctly spells a one-syllable word with <i>-ule</i>
8	lives	lifes	47.93	50.64	correctly spells a one-syllable plural word with <i>-ves</i>
9	coach	coche	41.33	41.45	correctly spells a one-syllable word with <i>-oa-</i>
10	heroes	heros	28.80	32.19	correctly spells a two-syllable plural word with <i>-oes</i>
11	news	nuse	29.99	35.05	correctly spells a one-syllable word with <i>-ew-</i>
12	addressed	adressed	14.97	18.17	correctly spells two-syllable word with <i>-dd-</i>
Proofreading — Error not identified					
13	close	cloze	83.42	85.30	identifies and corrects an error in a one-syllable word with <i>-se</i>
14	planting	plantting	75.74	79.42	identifies and corrects an error in a two-syllable word with <i>-ing</i>
15	hammer	hamer	57.54	62.54	identifies and corrects an error in a two-syllable word with <i>-mm-</i>
16	clown	cloun	55.98	60.57	identifies and corrects an error in a one-syllable word with <i>-ow-</i>
17	display	displae	41.35	47.06	identifies and corrects an error in a two-syllable word with <i>-ay</i>
18	chew	chu	35.90	40.09	identifies and corrects an error in a one-syllable word with <i>-ew</i>
19	visit	viset	39.49	42.08	identifies and corrects an error in a two-syllable word with <i>-it</i>
20	sign	sine	21.71	24.30	identifies and corrects an error in a one-syllable word with <i>-ign</i>
21	cities	citys	17.04	20.54	identifies and corrects an error in a two-syllable word with <i>-ies</i>

Item	Answer	Error	Qld %	National %	ACARA item description
22	praise	prase	12.80	15.86	identifies and corrects an error in a one-syllable word with <i>-ai-</i>
23	pleasant	pleasent	8.39	10.57	identifies and corrects an error in a two-syllable word with <i>-ant</i>
24	suitable	suitible	14.28	16.97	identifies and corrects an error in a three-syllable word with <i>-able</i>
25	magician	magishun	4.52	7.31	identifies and corrects an error in a three-syllable word with <i>-cian</i>

About the test

The 2019 test focused on the following spelling features:

- plurals: *lives*, *heroes* and *cities* (and also *news* which is plural in form but singular in function)
- long and short vowels: *spin*, *anyway*, *follow*, *people*, *rule*, *coach*, *news*, *clown*, *display*, *chew*, *sign* and *praise* (and also the vowels in the words *suitable* and *pleasant*)
- syllable-junction consonants: *addressed*, *planting* and *hammer*.

The focus of assessed spelling features changes from year to year. For example, in 2018 there were three compound words (*toothbrushes*, *tonight* and *butterfly*) but in 2019 only the word *anyway*. In 2018 there were three homophones (*cents*, *flour* and *whether*) but this year none were included.

Questions in the Spelling test were presented in two sets. The target words in the first set were misspelt and identified by being circled. Those in the second set were misspelt but not identified, so students needed to find them inside sentences containing other words (distractors) that were correctly spelt. These supplied misspellings may have led students to make different spelling choices to those made when they writing to dictation or using the targeted words to compose their own sentences.

See the [Resources](#) section for individual item analyses. These resources contain detailed notes on the tested spelling patterns and how students responded, including their common errors. They also provide word sorting suggestions for targeted teaching.

Performance

Students in Queensland performed slightly below the national average on all words, a trend that is consistent with the results of previous years. Their performance was notably lower on vowels spelt with digraphs (pairs of letters), e.g. *chew*, *rule*, *clown*, *people* and *follow* and also for short and long vowel sound items e.g. *news* and *display*. Students also achieved low facility rates for some of the plural words and vowel-digraph words.

Very few Year 3 students could spell the advanced vocabulary words *magician*, *pleasant*, *suitable* with the suffixes *-ian*, *-ent* and *-able*. Few could spell the word *addressed*, with the prefix *ad-* added to the root *dress*.

Implications for teaching

Spelling patterns are commonly taught in developmental stages with the help of mini-lessons focusing on specific patterns. Such focused spelling lessons can supplement the cross-subject teaching of vocabulary, reading and writing.

Students can be asked to sort lists of words and talk about the patterns they find by using the terminology of vowels, consonants, syllable stress, parts of speech, tense, plurals, derivation, prefixes and suffixes.

Below are some patterns relevant to the 2019 test that can inform classroom learning and teaching practice.

Pluralising words

- plural /s/ does not have an apostrophe, e.g. new, *news*
- nouns ending in /o/ often form the plural with -es, e.g. hero, *heroes*
- an /f/ sound often changes to /v/, e.g. life, *lives*
- change /y/ to /i/ and add -es, e.g. city, *cities*
- a sibilant sound takes -es, e.g. *dresses, splashes*
- irregular nouns have to be remembered, e.g. mouse, *mice*; man, *men*; child, *children*

Vowel digraphs

- long /u/ spellings, e.g. *rule, suit, chew, suitable*
- long /o/ spellings, e.g. *coach, follow, local, broke*
- vowels with /w/ influence, e.g. *clown, prowl, allow, powder*
- long /a/ spellings, e.g. *praise, display, shady, phrase, obey*

Language conventions — Grammar and punctuation

Results and item descriptions

The percentage columns give the facility rate (percentage correct).

Table 3: Language conventions — Grammar and punctuation results and item descriptions

Item	Answer	Qld %	National %	ACARA item description
26	A	94.33	95.27	identifies the correct coordinating conjunction to join two simple sentences
27	C	81.73	84.62	identifies a main clause to complete a simple sentence
28	B	87.12	88.51	identifies the correct determiner before a noun in a simple sentence
29	A	85.76	86.63	identifies that a statement needs a full stop
30	A	77.76	78.57	identifies an adverb in a compound sentence
31	B	66.42	68.09	identifies the correct plural reflexive pronoun in a complex sentence
32	B	67.58	69.77	identifies a simple sentence
33	A	60.27	64.97	identifies the correct use of a capital letter for a geographical place name
34	C	62.43	67.34	identifies the adjective in a noun group with an adverb
35	C	74.60	77.83	identifies the connective which correctly completes a complex sentence
36	D	59.33	61.46	identifies the correct suffix for a comparative adjective in a sentence
37	D	56.59	60.58	identifies the correct determiner to complete a sentence
38	A	58.67	61.59	identifies the correct position for a list comma in a simple sentence
39	A	53.22	55.51	identifies the pronoun to refer to a noun in a sentence
40	B	28.65	32.17	identifies the correct superlative form of the adjective in a compound sentence
41	B	41.42	43.49	identifies the sentence that correctly combines information from two sentences
42	C	38.89	40.61	identifies the sentence boundaries of a simple sentence
43	ADEH	30.50	35.25	identifies proper nouns that need to be capitalised in a simple sentence
44	A	33.60	34.52	identifies the pronoun in a sentence
45	C	25.18	26.50	identifies the correct use of apostrophes of contraction and possession in a sentence
46	D	23.44	25.41	identifies the correct conjunction to retain meaning in a complex sentence
47	A	24.88	23.17	identifies a verb in a simple sentence
48	D	19.47	19.40	identifies the correct punctuation of quoted speech with internal attribution
49	D	18.35	18.05	identifies an adverb in a simple sentence
50	an, a, an, an	17.84	20.28	identifies the correct article before a word beginning with a vowel sound

About the test

The Grammar and punctuation component of the Language conventions subtest focused on isolated sentence-level and clause-level skills. It included link items — items common to more than one year level. Link items assist with scaling scores and also suggest where teaching is needed for growth to occur from one tested cohort to the next.

While most items were similar to those in 2018, there was an increased focus on aspects of noun usage in the 2019 test.

Nouns, noun groups and determiners

These items tested knowledge of nouns, and determiners. Apart from the articles (*a*, *an* and *the*) there are other determiners which apply logically in context, such as demonstratives (e.g. *this*, *that*), possessives (e.g. *her*, *our*) quantifiers (e.g. *some*, *one*, *no*), distributives (e.g. *each*, *any*) and interrogatives (e.g. *which*, *what*).

- Items 28, 37, 38, 40, and 50 — a noun group might contain a determiner, an adjective and a noun, e.g. *a noisy car*, *an angry bird*, *the funnier one of the two* or *the funniest one of the three*. Plural nouns do not take a determiner, e.g. *a noisy car*, *noisy cars*. The noun number (singular or plural) affects both the determiner and any relevant verb, e.g. *there is a box*, *there are boxes*.
- Items 33 and 43 — proper nouns are the names of specific people or other things. Students usually understand that names, such as their own name, have a capital letter, but as they encounter more mature texts it becomes harder to identify a proper noun, e.g. the word *river* is a general noun unless it is part of the name of a specific river, *Diamantina River*.
- Item 47 — words that are formally verbs, such as *change* and *play*, can be used in such a way that they function as nouns instead, e.g. *make a change*, *stage a play*.

Several items were about linking together ideas within a sentence.

- Items 26, 35, 41 and 46 involve conjunctions; words that join together two clauses to show how the ideas in the clauses relate to each other, e.g.
 - the relation of cause to effect can be shown by the words *because* and *as*
 - when the word *who* is used as a conjunction, it shows which members of a group the main clause applies to.
- Items 31 and 39 involve pronouns. Pronouns allow the focus to remain of topic ideas without excess repetition of the topic word.
- Item 48 involves speech attribution: phrases such as *said Max*, used to show that words in a sentence are directly spoken. To use speech attribution correctly, students need to know about the conventions for punctuating direct speech.

Metalanguage (terminology)

These items required students to know grammatical terms:

- Item 29 — full stop, question mark, quotation mark and comma
- Items 33 and 43 — capital letter
- Items 34 and 49 — adjective, noun, verb, adverb
- Item 44 — pronoun.

Performance

Overall, Queensland Year 3 students performed close to the national average in Grammar and punctuation. They performed slightly above on Items 47, 48, 49 (on verbs, direct speech and adverbs), but noticeably lower on Items 33 and 43 (on capitalising proper names). They were also lower on Items 37 and 40, involving the words *how many parents* and *the funniest one*.

The items with very low facility suggest that students are challenged by advanced uses of apostrophes, direct speech and parts of speech.

Implications for teaching

The low facility rate for Item 40 (on the use of the superlative, *funniest*), and Item 46 (on constructing a sentence with a relative clause), are reminders that teaching of grammar is centrally about thinking and meaning and how conventions assist in the expression of ideas.

The poor performance on Item 40 might also be attributed to a lack of test-wiseness. Students should be encouraged to carefully read the whole context sentence and then substitute each of the option words into the blank space in the sentence to check which is correct.

Reading

Results and item descriptions

The percentage columns give the proportion of correct answers (facility rates).

Table 4: Reading results and item descriptions

Item	Answer	Qld %	National %	ACARA item description
Unit 1: Flying jewels				
1	B	86.77	89.96	identifies the main purpose of an information text
2	D	95.99	96.61	identifies an example of description in an information text
3	C	81.22	82.43	links information across sentences in an information text
4	A	81.58	84.09	locates directly stated information in an information text
5	C	66.98	69.18	infers the author's perspective at the end of an information text
6	D	72.31	75.31	evaluates the presence of information in an information text
Unit 2: Dragon in the sky				
7	A	76.25	77.74	interprets directly stated information in a narrative
8	D	60.06	63.21	interprets the meaning of a sentence from descriptive language in a narrative
9	D	70.65	73.44	locates directly stated information in a narrative
10	D	46.42	47.38	identifies the purpose of a description in a narrative
11	B	54.68	57.42	identifies the reason for a character's feelings in a narrative
12	C	45.43	47.78	identifies a character's feelings in a narrative
Unit 3: Collecting				
13	A	80.81	83.12	identifies the main purpose of a persuasive text
14	A	70.01	72.97	locates directly stated information in a persuasive text
15	B	55.11	59.07	identifies the main idea of a paragraph in a persuasive text
16	C	49.90	53.67	identifies the purpose of a rhetorical question in a persuasive text
17	B	50.98	55.24	identifies an opinion in a persuasive text
18	C	48.90	51.64	interprets the meaning of a phrase in a persuasive text
Unit 4: Dingle's game				
19	C	62.89	64.00	identifies the main idea of a narrative
20	B	54.89	54.86	identifies the purpose of the opening paragraph in a narrative
21	D	72.83	75.43	interprets the meaning of a simile in a narrative
22	B	47.63	48.94	interprets the meaning of a phrase in context in a narrative
23	A	34.39	35.50	identifies the purpose of italicised text in a narrative
24	C	31.69	32.84	interprets information in a narrative
25	C	75.81	79.09	identifies an example of description in a narrative
Unit 5: Welcome to Cape Lighthouse				
26	B	70.78	74.07	interprets directly stated information in a persuasive text
27	D	18.22	19.16	links information across sentences in a persuasive text

Item	Answer	Qld %	National %	ACARA item description
28	B	53.05	56.49	interprets directly stated information in a persuasive text
29	A	37.03	38.69	identifies a persuasive device in a persuasive text
30	C	23.14	22.42	interprets the meaning of a description in a persuasive text
31	A	24.10	24.15	interprets the meaning of a phrase from context in a persuasive text
Unit 6: Spaceman Yuri				
32	B	34.38	35.85	identifies the main idea of a paragraph in an information text
33	C	27.16	28.36	infers the reason for an event in an information text
34	B	24.41	24.53	analyses the impact of an event in an information text
35	B	21.17	21.06	interprets directly stated information in an information text
36	D	19.09	18.77	interprets the significance of an event in an information text
37	CD	6.90	8.04	interprets directly stated information in an information text

About the test

In 2019, the Year 3 Reading test consisted of 37 items based on 6 reading magazine units:

Unit 1: *Flying jewels*

Unit 2: *Dragon in the sky*

Unit 3: *Collecting*

Unit 4: *Dingle's game*

Unit 5: *Welcome to Cape Lighthouse*

Unit 6: *Spaceman Yuri*.

The majority of items are presented in a standard multiple-choice format, where students are required to make one selection from four provided options. Two items differed from this format; Item 25, where students select one option from nine presented, and the last item, Item 37, where students are required to provide two responses.

In NAPLAN Reading tests, items tend to increase in difficulty as students' progress through the Reading test. Due to this, facility rates typically decrease as students progress from the first reading unit through to the last. The literacy demands of reading stimuli generally increase from the first to the last reading unit, distractors become more sophisticated and item construction becomes more complex.

Rather than categorise reading units by genre, it is useful to consider the items by question type (see Table 5). This is partly because many of the reading stimulus texts contain features of multiple genres. Furthermore, item analysis shows that some students will select a distractor because they think that it relates to a specific genre. Capable students may also be drawn to these distractors.

Table 5: Question types in Reading test

Question type	Method	The reader is asked to:
Literal	Recall	recognise or recall information
	Translation	change information into a different form — it might involve paraphrasing the ideas or restating them in terms or forms other than those in the text
Text-based inferential	Interpretation	identify the relationships among ideas, definitions, facts and values — these would involve such relationships as comparisons and cause and effect; they involve a minimum of higher-order thinking as the reader/learner needs only to respond to and manipulate ideas in the text
Higher-order (context-based) inferential	Application	solve real-life problems by extrapolating what is in the text — readers/learners need to combine ideas from the text with prior knowledge
	Logical analysis	analyse and judge the quality of the logic inherent in the text — readers/learners might, for example, identify fallacies or points of view represented in a text
Creative	Synthesis	respond to a problem or idea with original and creative thinking
	Evaluation	make judgments with respect to specific criteria

Source: *Years 3, 5 and 7 Literacy Test: A framework for describing reading items*, QSA, 2004.

Categorising items by question type puts the focus on the most relevant reading strategies required to answer items correctly. An examination of question type makes it clear that simply underlining or highlighting text may only be useful for one of question type — literal questions. Most items in a NAPLAN Reading test require text-based inference or higher-order inference. Of the 37 questions in the Year 3 Reading test, 10 are literal questions; meaning the majority required some degree of inferential thinking (see Table 6).

Even in the early units of the Year 3 Reading test, students are required to be able to perform text-based inferences. Despite being the more accessible reading units, they contain relatively few literal questions.

Performance

Table 6: Question types and average facility rates by unit in Year 3 Reading test

	Flying jewels	Dragon in the Sky	Collecting	Dingle’s game	Welcome to Cape Lighthouse	Spaceman Yuri
Literal	3	1	1	1	3	–
Text-based inference	3	4	4	6	2	1
Context-based inference	–	–	1	–	1	5
Creative	–	1	–	–	–	–
Average facility rate	80.81%	58.92%	59.29%	54.30%	37.72%	22.19%

The individual facility rates for the first unit, *Flying jewels* (Items 1–6), are the highest in the Year 3 Reading test, with an average facility rate of 80.81%. Of these six items, three were literal questions and three were text-based inferential questions. The lowest facility rate for this unit is Item 5 (66.98%) which asks readers to infer the author’s perspective from an information text. Some students are likely to have found this item more challenging because it was framed in the negative, *What information is not in the text?*

Overall, Queensland Year 3 students demonstrated the ability to achieve higher facility rates when assessed content is able to be directly located in the text, and only literal comprehension skills are required.

Facility rates decreased significantly for the next unit, *Dragon in the sky* (Items 7–12) with an average facility rate of 58.92%. Items increased marginally in complexity, and this text was more demanding than the previous one. There was one higher-order inference item and an additional text-based inference item than in the previous unit.

The higher-order question was Item 10, with a facility rate of 46.42%. In this item, the reader is asked to evaluate the author’s choice of textual feature, in this case, personification. Year 3 students who were only familiar with literal comprehension skills will have found this concept abstract and therefore challenging to answer.

The third unit, *Collecting* (Items 13–18), has a very similar facility rate (59.29%) to *Dragon in the Sky* (Unit 2). This unit has one literal, four text-based and one context-based inference question. A feature of these types of questions is that they require reading beyond the sentence level to make meaning from the text. There are items in this unit that require students to identify the main ideas in paragraphs or the text as a whole. Students only familiar with reading at the sentence or word level would have had difficulty with these items.

The stem for Item 16 consists of an excerpt from the final paragraph of the text but requires the reader to combine ideas from the entire text. The purpose of the last paragraph is to summarise the text to persuade readers to take up collecting. Students who attempted to interpret the excerpt in isolation from the rest of the text would be unlikely to answer correctly.

Dingle’s game (Items 19–25), has a slightly lower average facility rate than the prior units of 54.30%. This unit contains five text-based inferential questions, the highest number in the Year 3 Reading test. Item 25 was the only item that was not a standard multiple-choice format question in the Year 3 Reading test. Students were presented with nine options, rather than the standard four options.

Inferential reading of a text requires the reader to combine ideas from the text with their prior knowledge. Item analysis indicates that in this unit some students appeared to have been influenced by their personal views regarding large dogs. Students must be careful not to interpret a text based unduly upon personal biases or beliefs without reference to the text. Item 22 illustrates this point where the most popular distractor was that Dingle *might do something dangerous*. There is no evidence to support this selection in the text. This appears to be a case of students resorting to their bias about big dogs. It is important that students are exposed to learning activities that promote the development of higher-order reading skills based on a close examination of a text.

The *Welcome to Cape Lighthouse* unit (Items 26–31) continues the overall trend of decreasing average facility rates as students progress through the test. This unit contains three literal questioning items, which suggests that students could find the items associated with this unit easier than those of the previous unit. However, one of these literal questions (Item 27) achieved amongst the lowest facility rates in the entire test, at 18.22%. This was the only item in the Year 3 Reading test in which the options were presented as numbers (a series of dates). The first paragraph contains eight references to dates, values and numbers which some students may have found difficult to access and interpret. Despite the options being presented in numerical form, readers were still required to make meaning from the text to select the correct option.

Literal questions still require a level of translation on the part of the reader. Translation is required to understand that the light was *first officially lit on the 23rd of May*, meaning that it was at this point in time it commenced being a *working lighthouse*.

Another item in the *Welcome to Cape Lighthouse* unit that students had difficulty with was Item 30, with a facility rate of 23.14%. It appeared that many students experienced difficulty distinguishing the use of superlatives in the text from modality.

The final unit of the Year 3 Reading test, *Spaceman Yuri* (Items 32–37), had the lowest average facility rate in the test of 22.19%. This is likely to be due to the absence of literal questioning in items and the greater degree of sophistication required to fully appreciate the text. There was one text-based inferential question and five higher-order inferential questions for this unit.

Higher-order inferential questions can require the reader to make connections within a text, between texts and more broadly from the text to the world of the reader. Items 33–37 all have facility rates of below 30%, which indicates the challenge that higher-order inferential questions pose for students. The facility rate for the final item, Item 37, was the lowest in the Year 3 Reading test at 6.90%. This low facility rate may have been influenced by the requirement for students to select two options for this item, whereas the other 36 items only required one response.

Summary

Queensland students achieved the highest facility rates in the items requiring literal comprehension skills. Facility rates were lower for those items assessing text-based inferential skills and were lower still for those requiring higher-order inferential skills — context-based inference and creative reading tasks (see Table 7). NAPLAN Reading tests typically contain more items requiring text-based and higher-order inferential skills than literal reading skills.

Higher-order inferential questions can be identified by their requirement for the reader to:

- combine ideas within a text
- gain a complete understanding of the text as a whole
- apply prior knowledge as appropriate
- have a conceptual understanding of the text
- balance what might appear to be contradictory ideas.

Those students with greater experience and proficiency in answering items requiring higher-order inferential skills are likely to have performed well in the 2019 Year 3 Reading test.

The uncharacteristically low facility for Item 27 will have brought the average facility rate down for literal questions. Also, there was only one item requiring creative higher-order inferential skills in the test, which limits the reliability and comparability of data for this question type.

Table 7: Average facility rate by question type

Question type	Average facility rate %	Number of items (Total 37)
Literal	68.19	9
Text-based inference	53.81	20
Context-based inference	26.69	7
Creative	46.40	1

Implications for teaching

Lower facility rates on text-based and higher-order inferential items demonstrate the need to teach students reading strategies that make meaning from texts involving more complex reading skills. Questions that involved purpose, main idea, theme or tone in the text, making meaning where there are apparent gaps in the text, and those that involve reading beyond the sentence level all require higher-order reading skills.

Teachers should consider how to provide students with opportunities to read and make meaning from a variety of texts. The teacher can guide students through the reading stages. The first stage is to establish an overview of the text. What sort of text does it look like? What does it seem to be about? What do I already think about the topic? There is value in using discussion groups to explore existing ideas on the topic so that students can be prepared to identify what the text says that may be different from their expectation. Working collaboratively with other students will expose readers to a broader range of ideas and reading strategies as readers discuss how they make meaning from the texts.

Assist students to conduct a scanned reading of the text in order to identify the main structural components. Note how the parts of the text contribute towards a main idea and also to the meaning of the whole. This is the time to discuss patterns such as cause and effect, contrast, and comparison. Teachers are facilitators of this process of students annotating and discussing texts; they are not intended to be the leaders.

The focus should be on:

- modelling a love of books and reading
- finding authentic texts at an appropriate level which will engage students
- providing a range of genres and texts, from traditional to those postmodern elements
- promoting higher-order thinking and questioning of texts
- reading aloud to students to promote reading for pleasure and introduce texts that they might not otherwise be exposed to
- developing an awareness of how the parts of the text combine to create a whole through both semantic (links between ideas) and syntactic (grammatical links) cohesion
- encouraging students to make inferences as they read, i.e. an informed guess supported by evidence from the text
- modelling to students connections between the text and their own knowledge and experience, between different things within the text and between this text and others
- developing student capacity to be active readers and to make their own connections between the text and their knowledge, experience and feelings
- providing students with opportunities to discuss and share their understandings of a text while asking them to substantiate their interpretations from the text.

In Year 3, this approach must be applied selectively. Some students may still be grappling with basic word and grammar decoding.

Students need to build familiarity with a range of texts to learn how modality is managed by the writer and how this affects degrees of certainty and obligation. Being able to establish a text tone, mood and purpose in all levels of persuasive and narrative texts can be very challenging for students at all levels.

Students should be encouraged to read with a pencil and highlighter in hand, to identify main ideas, visual and text features (e.g. figures of speech, use of data). It's not too early to have students in Year 3 to check for fallacies and persuasive techniques, to draw attention to emotive language and literary techniques and to check for comparisons and contrast within the text.

Teach students to read at the sentence level to identify the main parts of a text. Show also how to locate the main idea in each section. How do the main ideas relate to the author's purpose, and what do they hope the texts will achieve? The ability to discern the main idea, or overall theme of a text is assessed in several items across the range of texts. In a test setting, students will manage the distractors in the items more effectively if they are clear about the subject matter and the purpose of the text before they proceed to respond to the items.

Teachers have a role in encouraging students to read for pleasure, to extend their knowledge of themselves and the world around them. Reading develops a student's empathy for others in different circumstances. The complexity of the reading process is made more visible when students discuss a text and share how they arrive at their personal understanding of the text, using the text to justify their interpretations.

Numeracy

Results and item descriptions

The Australian Curriculum Mathematics content strands are abbreviated as follows:

- Number and Algebra NA
- Measurement and Geometry..... MG
- Statistics and Probability SP.

All items are worth one score point. However, there is a range of difficulty across the items.

The percentage columns give facility rates (percentage correct) for each item.

Table 8: Numeracy results and item descriptions

Item	Content strand	Answer	Qld %	National %	ACARA item description
1	NA	13	93.39	94.31	adds two one-digit numbers represented pictorially
2	NA	2	76.98	81.27	solves a simple subtraction problem with numbers less than 10
3	NA	A	94.25	95.18	continues patterns with objects
4	MG	B	86.70	88.48	compares objects by length
5	SP	B	78.57	79.82	identifies the least likely outcome of a chance event
6	NA	D	71.51	74.71	evaluates collections of Australian currency
7	NA	D	83.45	86.20	uses place value to subtract two four-digit numbers
8	NA	A	80.29	82.55	solves a problem involving the recall of multiplication or division facts
9	MG	C	77.63	80.27	identifies a given time, to the half-hour, on a digital clock
10	NA	C	77.06	81.76	doubles a two-digit number, regrouping for the tens digit
11	SP	D	81.01	83.19	identifies the most appropriate survey question for an investigation
12	NA	C	63.72	67.77	calculates a fraction of a whole number
13	MG	A	76.69	78.67	identifies a symmetrical shape in context
14	MG	D	60.22	62.21	identifies features of three-dimensional objects
15	MG	D	64.38	66.71	uses a calendar to identify a date
16	MG	6	55.46	58.63	determines the number of informal units needed to cover a given area
17	NA	B	57.95	62.88	solves a problem involving multiples of one half
18	NA	BE	56.62	59.23	identifies odd numbers from a selection
19	SP	2	42.95	47.80	uses addition and subtraction to interpret a table
20	SP	C	63.02	65.07	identifies the outcome of a familiar chance experiment

Item	Content strand	Answer	Qld %	National %	ACARA item description
21	NA	C	48.06	50.37	identifies a problem which has been represented as a division number sentence
22	MG	A	43.08	46.65	calculates a duration in hours and minutes given start and end times
23	MG	E	50.72	52.23	describes a location using a grid reference
24	NA	D	31.57	33.61	solves a problem by representing multiplication as repeated addition
25	MG	B	39.58	44.17	compares the areas of irregular shapes on a grid
26	NA	36	23.86	28.92	investigates number sequences involving multiples
27	NA	A	26.49	28.55	calculates change to the nearest 5 cents
28	NA	23	25.99	29.53	solves a multistep addition and subtraction problem
29	MG	B	28.46	32.12	estimates length on a map given a simple, but non-routine scale
30	SP	15	30.93	36.01	interprets a picture graph where one picture represents many data values
31	NA	C	42.68	47.79	solves a problem involving the complement of a fraction
32	NA	BD	37.56	41.69	uses knowledge of place value to describe a four-digit number
33	SP	C	28.48	32.90	interprets data displayed in a column graph
34	NA	1	17.20	21.01	solves addition and subtraction problems by rearranging parts
35	NA	B	22.43	23.87	multiplies two, two-digit numbers, where one is a decade number
36	NA	30	7.12	9.71	partitions numbers using place value to calculate the sum of two numbers

About the test

The Year 3 NAPLAN Numeracy test consisted of 36 items covering concepts and skills from the three content strands and the four proficiency strands of the Australian Curriculum: Mathematics. Student results were reported as a single score.

The distribution of the 36 items across the content strands was:

- Number and Algebra (NA) 20 items
- Measurement and Geometry (MG) 10 items
- Statistics and Probability (SP) 6 items.

Of the 36 test items:

- 27 items (75%) were multiple-choice, with the remaining 9 items (25%) requiring students to provide their own answers (constructed responses)
- 27 items (75%) required interpretation of tables, graphs or diagrams; the remaining 9 items (25%) were word problems that typically incorporated numerals within the information and item stems.

Performance

While the majority of students attempted to answer all test items, some omitted the more difficult items towards the end of the test. Items presented in the constructed response format had higher omission rates than those in multiple-choice format. Item 36 had the highest omission rate in the test, at 8%.

Items which had higher omission rates typically contained more complex item stems, or appeared toward the end of the test, where students may have felt pressured by time and were therefore unable to attempt a response.

NAPLAN test items are designed to discriminate between varying levels of competence and confidence. The more challenging items provided capable students with opportunities to apply their knowledge and skills to solve problems. Students with a good knowledge of a range of concepts and who are confident in using these in a variety of contexts were more likely to solve these items given sufficient time.

Queensland students performed close to the national facility rate on the following items:

- Item 1 — Number and Algebra: adds two one-digit numbers represented pictorially
- Item 3 — Number and Algebra: continues patterns with objects
- Item 35 — Number and Algebra: multiplies two, two-digit numbers, where one is a decade number.

The facility rate for Queensland students ranged from 95% for Item 3, to 7% for Item 36. This trend is typical of NAPLAN test performance, as the most difficult items are located towards the end of the test.

There was evidence that students understand basic mathematics content — for example, that fractions are parts of a whole — but appeared unable to apply this knowledge in unfamiliar contexts to solve a problem.

Year 3 students are expected to be able to perform routine addition and subtraction operations. However, the data shows that when subtraction is presented as a missing addend, or in an unfamiliar context, many students made errors. Students were not able to link addition to subtraction or understand the inverse relationship that exists between these two operations.

Other difficult items for Queensland students were those presented as word problems describing real-world contexts that often included diagrams or tables. Students had to interpret the presented information before determining the mathematical procedure(s) required to solve them. Many students find word problems particularly challenging. It seems that reading, interpreting and deciding what to do may be part of the difficulty.

Item complexity

The challenge of specific items for students may be increased either by the difficulty of the concept being assessed, or by the complexity in the way an item is presented (e.g. a lengthy stem, tabular or graphical representation), or by requiring multiple responses. Examples of items with higher levels of complexity include:

- Item 13 and 14 — visualise and identify symmetrical shapes and features of three-dimensional objects
- Item 21 and 34 — determine what the important information is and satisfy multiple required components
- Item 25 — compare the area of irregular shapes on a grid
- Item 26 — investigate number sequences and extrapolate a pattern beyond the data given

- Item 28 — interpret scenarios and complete missing data values
- Item 29 — estimate and use non-routine scales contained within a map
- Item 30 — interpret a picture graph where one picture represents many data values
- Item 32 — satisfy more than one criterion, rather than the more common single option
- Item 33 — interpret the vertical axis on a temperature graph
- Item 34 — interpret a problem presented in an unfamiliar format.

Difficult items

Difficult items are items that deal with more complex mathematical concepts and processes. Examples include:

- Item 16 (constructed response: visualisation) — visualise that an additional four books are needed to cover the desk
- Item 21 (multiple choice: multiplication and division) — solve a word problem involving division in a number sentence and requiring consideration of the relative positions of numbers to be able to identify a context that matched the number sentence
- Item 22 (multiple choice: problem-solving) — solve a problem to determine how long it takes to travel between two destinations
- Item 24 (multiple choice: problem-solving) — solve a worded problem involving Australian currency using multiplication or repeated addition
- Item 26 (constructed response: reasoning and extrapolating) — extrapolate a pattern beyond data given
- Item 27 (multiple choice: addition and subtraction) — recognise the value of money and calculate the change from a purchase
- Item 28 (constructed response: addition and subtraction) — interpret a scenario and complete missing data values to obtain the sum of single-digit numbers in the second row of the table
- Item 29 (multiple choice: problem-solving) estimate the width of the islands of Indonesia using the scale contained within a map.

Queensland students found the last four test items to be the most challenging:

- Item 33 — this had an omission rate of 6% and more than 70% selected incorrect responses. Many students appeared unable to deduce that the vertical axis increased by increments of 2 degrees
- Item 34 — the second most difficult item, with an omission rate of 6% and only 17% answering correctly. Students needed to deduce that the answer would be obtained by adding a number to a group and then partitioning the resulting group into two equal parts
- Item 35 — only 22% answered this item correctly. Success in this item was dependent upon student knowledge that there are 60 seconds in one minute.
- Item 36 — the most difficult item of the test, with an omission rate of 8% and only 10% answering correctly. Students needed to understand and be able to apply the mathematical conventions for the use of the equals sign (=), that is, the requirement for an equation to be true or correct. Students may not have understood that they needed to provide a value that would make the total on each side of the number sentence equal.

Implications for teaching

General observations

Teachers are encouraged to look at their class results and compare how their students performed on these items. Poor performance in these items may suggest that students would benefit from being introduced to a greater range of problems with slightly increased complexity to develop their ability to reason mathematically.

Schools and teachers can use overall performance data for Queensland and Australia to compare against their own data in SunLANDA. They can also use this to evaluate how difficult a particular aspect of numeracy was for all Queensland Year 3 students. If teachers combine this with similar data from previous NAPLAN tests, they can judge for themselves the relative difficulty of various concepts and skills.

When dealing with difficult and often unfamiliar items, teachers are encouraged to impress on students the importance of being persistent and systematic in their approach. Solutions will often not come easily or quickly to such items and not giving up straight away, being persistent, is critical to achieving a result.

When dealing with word problems, students should be encouraged to read the whole item more than once. The first read is to get a general idea of the scope and intent of the item. Subsequent readings are to identify important or relevant information and to understand the actual task to be done or the specifics of the problem to be solved.

Transcribing the written information contained in word problems into a more useful format, such as drawing a sketch or diagram, a table or a list, is a valuable skill for students to develop. The ability to translate words into mathematical statements can be an important element in solving some word problems.

Test-wiseness

Test-wiseness refers to the skills that help students maximise their chances of successfully answering every item, even when they are not completely sure of the correct answer. Strategies for students to develop test-wiseness include:

- pacing their test experience to allow more time for the most challenging questions found at the end of the test
- attempting all items. There are no penalties if a response is incorrect, and therefore it is prudent to answer every item, even if this involves some guesswork
- reading each item more than once to identify the relevant information, clarify what they need to do, and what is expected in the response
- translating word problems into mathematical or algebraic expressions to clarify what needs to be calculated
- regular exposure to word problems involving each of the four operations (and combinations of these) so that they can readily recognise the language associated with each operation, as well as commonalities in the language
- double-checking answers for accuracy and reasonableness. Whether responding to very easy items or more difficult ones, students should always check to make sure their response actually answers the question asked in each item
- flagging items they cannot readily answer so that they can return later if time permits.

Problem-solving

Problem-solving involves a plan or process and using a variety of methods, either learned or reasoned, in a logical manner to find a solution. Students require opportunities to make their own decisions about how to solve a problem. Teachers can pose mathematics problems derived from different curriculum areas.

Teaching problem-solving strategies to students and providing opportunities to develop problem-solving skills is an important part of mathematics education. Problem-solving should not be taught in isolation but should instead be incorporated into regular teaching and learning experiences.

A four-step problem-solving model from the book, *How to solve it*, by George Polya (Princeton University Press, 1949) provides a clear outline of one method to teaching problem-solving skills to students.

The four steps are:

1. Understand the problem

One of the challenges in teaching problem-solving to children is to ensure they understand the nature of the problem. Recognising what is actually being asked in a task involving a numerical solution, whether it is a test item or a classroom task or a real-life problem, is often the key to strategising correctly. Students should look for what information is given and what is the unknown to be discovered. It may help students to draw a diagram. They should also introduce suitable notation related to the problem.

2. Devise a plan

Find the connection between the known data and the unknown. Sketch out a plan of the solution.

3. Carry out the plan

Check each step as you go. Can you prove that each step is correct?

4. Look back

Examine the solution obtained. Check its reasonableness.

While all steps are important, step 4: look back, is particularly beneficial in test situations. Students can ask themselves: 'Is my answer reasonable?' and 'Does my solution answer the question correctly?'

Consider these points when explicitly teaching problem-solving skills to students.

- Teachers should incorporate problem-solving into mathematics lessons to develop fluency and assist students to become familiar with solving problems related to the maths they are learning rather than addressing it as a separate concept.
- Students need exposure to a range of word problems that involve different combinations of mathematical operations and visual text, so that they become familiar with the language associated with operations in different contexts.
- Students should familiarise themselves with the terminology used when solving word problems.
- Teachers should provide opportunities for students to share and discuss their problem-solving strategies to expand students' repertoire of strategies, such as:
 - reading the whole question more than once — the first time to get a general idea of what it is about, and subsequent readings to identify important information and what the question is asking
 - circling or underlining key information
 - sorting information into a more useful form by drawing a diagram or making a table or list.

Interpreting graphical information

Of the 36 items on the 2019 Year 3 Numeracy test, 26 items (72%) required interpretation of visual data, in the form of grids, diagrams, tables, graphs or other images.

The ability to recognise the different ways that data can be represented is an important element of numeracy. It is important that students are given opportunities to develop their visual literacy skills through frequent exposure to and practice with problems or scenarios that involve visual content.

Teacher-led class discussions about visual data will help students develop the skills, strategies and experience required to interpret them. Strategies include visualisation, spatial recognition, line measurement and estimation. Even problems or tasks without any visual stimulus may be conceptualised by drawing sketches, tables, diagrams or creating models.

For example, students should be familiar with geometrical representations of two-dimensional shapes and three-dimensional objects from different perspectives and orientations. Also, the ability to interpret simplified maps or grids to identify directions, locations and directions is beneficial.

Visual literacy in mathematics also relates to data or graphical displays covering varied contexts. Students should be familiar with tally tables, column graphs, picture graphs, data tables, dot plots, number lines and calendars. Students need to be able to interpret mathematical problems containing images. An image may contain essential numerical information that is needed to progress to a solution.

Resources

Analysis of student performance and error reasoning is available on the QCAA website through:

- NAPLAN test item analysis — www.qcaa.qld.edu.au/p-10/naplan/test-reporting-analysis/test-item-analysis
- SunLANDA — www.qcaa.qld.edu.au/p-10/naplan/test-reporting-analysis/sunlanda/accessing-navigating-sunlanda

Additional QCAA publications are available below.

- QSA, 2005, *Mathematics: About space* is a useful reference for the teaching of spatial reasoning and geometric properties — www.qcaa.qld.edu.au/downloads/p_10/kla_maths_info_space.pdf
- *Years 3, 5 and 7 Literacy Test: A framework for describing reading items* is based on Bloom's taxonomy, and referred to in the Reading section of the State report and the individual item analyses — www.qcaa.qld.edu.au/downloads/p_10/3579_describing_read_items.pdf
- *Beyond NAPLAN: How to read challenging texts*, QCAA, 2015. The *Beyond NAPLAN* series offers teachers a model for introducing conversations about the thinking required to dissect a text thoroughly — www.qcaa.qld.edu.au/downloads/p_10/3579_describing_read_items.pdf

References

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Polya G, 1949, *How to solve it*, Princeton University Press, New Jersey, USA.

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