NAPLAN

2016 State report: Year 3

Queensland Government
Queensland Curriculum & Assessment Authority
For all Queensland schools

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Preface

The purpose of the National Assessment Program is to collect information that governments, education authorities and schools can use to determine whether Australian students are reaching important educational goals. As part of that program, the Literacy and Numeracy tests are valuable sources of information about literacy and numeracy learning that can be used to inform educational policy and current educational practice.

The National Assessment Program — Literacy and Numeracy (NAPLAN) tests were developed using the nationally agreed *Statements of Learning for English* and *Statements of Learning for Mathematics, 2005*. From 2016 however, the tests will now directly relate to the Australian Curriculum.

The NAPLAN tests are designed to provide a nationally comparable indication of student performance in Language conventions, Writing, Reading and Numeracy. The tests are designed to assess a student's ability to demonstrate the following skills:

- **Language conventions:** The test assesses the ability of students to independently recognise and use correct Standard Australian English grammar, punctuation and spelling in written contexts.
- **Writing:** The test assesses the ability of students to convey thoughts, ideas and information through the independent construction of a written text in Standard Australian English.
- **Reading:** The test assesses the ability of students to independently make meaning from written Standard Australian English texts, including those with some visual elements.
- **Numeracy:** The test assesses students' knowledge of mathematics, their ability to apply that knowledge in context independently, and their ability to independently reason mathematically.

This document reports the performance of Queensland students in Year 3 who sat the 2016 National Assessment Program — Literacy and Numeracy (NAPLAN) tests.

Who should use this report?

NAPLAN: State report will help teachers, principals and other school personnel understand, interpret and use the student performance information contained in the test reports. Class and school reports are supplied electronically on the secure section of the Queensland Curriculum and Assessment Authority (QCAA) website: https://naplan.qcaa.qld.edu.au/naplan/pages/login.jsp. 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.

Principals

Principals can use this document to help interpret their school reports and to provide information to the school community on aspects of the tests. The document provides information on how to access and interpret the online reports located on the QCAA's website.

Curriculum leaders, Heads of Department and Heads of Special Education Services

Queensland's performance on each of the Literacy and Numeracy strands is provided in this document. Curriculum leaders can use this information to interpret the class reports.

Classroom teachers

Classroom teachers can use information such as the item descriptors, state and national results

and the commentaries provided in this report to interpret their class reports. Teachers can compare the performance of their students on a particular item with Australian results. For example, 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. The results for such an item may provide information about the learning challenges associated with that concept but should not necessarily be cause for concern.

Parents/carers

Parents can use the information in this document to interpret the results on their child's report. They are also able to judge how their child performed when compared with the whole population of students. The item descriptors provide useful information about the scope of the tests.

Pre-service teachers

Pre-service teachers will find the information in the commentaries on overall student performance useful in gaining an understanding of what students know and can do in some areas of Literacy and Numeracy at Year 3.

Placing the tests in the assessment context

The NAPLAN tests are national instruments designed to contribute to a school's assessment program and to inform the teaching and learning cycle. It must be remembered, however, that the results from the 2016 NAPLAN tests represent only one aspect of a school's assessment program.

The results from a school's formal and informal assessment of students should be consistent with the NAPLAN test results. Principals and teachers should keep in mind that these were pencil-and-paper, point-in-time, timed tests. If the test results are different from what was expected, consider the 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.

Marking and scoring the tests

Marking the tests

The tests are scored against nationally agreed marking guides. There are four guides, one for the writing task and one each for the open responses in reading, numeracy and spelling. These guides provide information on the acceptable forms of the correct answer.

For the Numeracy tests, students may provide a correct response in different forms. Professional officers review these results and decide how to score.

Calculating raw scores

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

Constructing scale scores

Raw scores have limited use. 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.

To achieve this, raw scores are transferred to a common scale that reflects how difficult it was to achieve each score. The scale is comparable between year levels for each assessment area. An equating process is also carried out on each year's test to enable scores to be compared between years of testing. This might mean, for example, that a raw score of 20 on the Year 3 Reading test is transformed to a scale score of 354. This will also represent the same achievement for a student with the same scale score in Year 5, and for a student with the same scale score for Reading in a previous year.

The single scale for all students in all year levels is centred on approximately 500. Scale scores also provide a basis for measuring and comparing students' abilities across years of schooling, for example, comparing a student's result in Year 3 in 2014 and Year 5 in 2016.

From 2017, the move toward a NAPLAN Online testing platform will commence, with the involvement of up to 115 Queensland schools in this first year of transition. Scaling processes involving both paper-based and online testing programs will continue to ensure comparability.

Using scale scores

The scale score can be used to compare the results of different students. Principals and teachers should take care when making comparisons between small groups of students. For groups of fewer than 10 students, differences may not be reliable, particularly small differences.

The scales can be used to monitor the growth of groups of students over time. Principals and teachers should ensure that the compositions of the groups are the same. This enables the school to evaluate special programs that may have been put in place.

Understanding the data

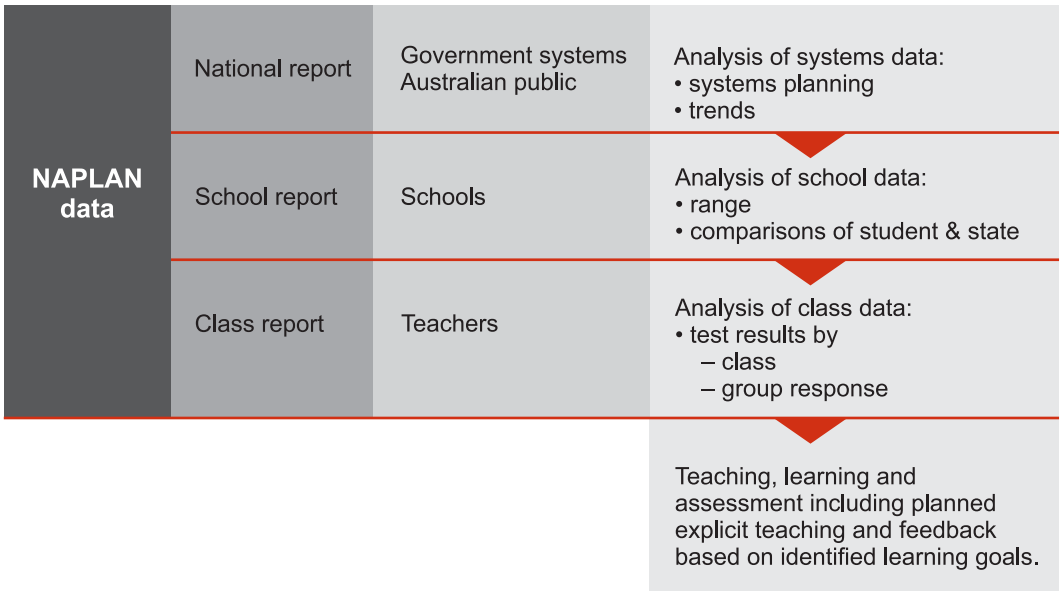
Which reports?

The *NAPLAN National Summary Report* and the NAPLAN National report provide nationally comparable data about student performance within the National Assessment Program. These reports provide states and territories with information about the achievement of their students in relation to their peers across the nation. Reports are available from the Australian Curriculum Assessment and Reporting Authority (ACARA) website.

This NAPLAN State report provides detailed information about student performance on each of the test items. It gives information about:

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

Together, these publications provide system-level information and are publicly available.



The NAPLAN School reports give information about a school's performance in each year level tested. 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 scale scores
- distribution of achievement bands
- school and state means
- participation of the group.

The shading shows the range of performance for the middle 60% of Queensland students together with the state mean, and positions a school's performance within the state.

The NAPLAN class reports show the performance of each student on every item. They show the items a student had correct and the errors made in each strand (with the exception of reading, where the answers are generally too long to record).

The report also gives the:

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

The NAPLAN school and class reports are available to schools from the QCAA secure website.

Using reports to improve teaching and learning

While the national and state reports provide the comparative data, it is the class reports that provide a school with the information that can be used to inform teaching and learning and to build capacity in schools. Analysis of the NAPLAN class data, in particular the performance on each item, will provide teachers with information about the understandings and patterns of misunderstandings in student learning.

An analysis of the distracters presented in multiple-choice items and the answers to the constructed-response items, other than those for reading, is available through the SunLANDA data analysis tool. This is available on the QCAA website and is designed to help schools with their analyses of class and school results. These results should be placed in a context with other school-based assessments.

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. Schools can:

- compare the facility rates (percentage correct) of items to see if their performance is consistent with the national and state results available in this document
- 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 are found in the item analyses that are part of SunLANDA).
- form hypotheses about why students are making these errors, e.g.
  - How did students think about this aspect of curriculum?
  - What misunderstandings might these errors represent?
  - How might the structure of the test question have shaped the response?

Using a combination of the NAPLAN data, school data and professional judgment, teachers should then test these hypotheses to see whether they are valid or whether there is more to be thought about and investigated. Interpretation of these results allows teachers to make judgments about teaching approaches and curriculum.

The professional conversations that are part of this process are the most effective and powerful way to use the data as they are the vehicle for developing shared understandings.

Year 3 Writing

Writing prompt

YEAR 3 AND YEAR 5

Characters

Imagine

Imagine if a character found an object that made something amazing happen.

Write a narrative (story) about the adventure.

You can use the characters and objects on this page **OR** you can make up your own.

Think about:

- the characters and where they are
- the complication or the 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.

Objects

Key messages

About the task

In 2016, the NAPLAN Writing test was based on the narrative genre. As was the case in 2015, two prompts were used, one for Years 3 and 5 and another for Years 7 and 9. The test conditions and administration remained the same as in previous years. That is, teachers delivered the same spoken instructions and read the text aloud to students. Working independently, students had to plan, compose and edit a written response. Students were allowed five minutes to plan, thirty minutes to write their script, and a further five minutes to edit and complete the task. Three pages were provided for students to write a response.

The 2016 prompt for Years 3 and 5 was titled *Imagine*. Students were asked, in the textual component of the prompt, to imagine if a … *character found an object that made something amazing happen.* They were asked to *… write a narrative (story)* about the *adventure.* Additional information was provided in the textual component of the prompt. This named the structural components, and further defined these elements, e.g. *the complication or the problem to be solved.* Other notes were also provided in relation to the conventions associated with the writing task, e.g. *write in sentences, check and edit your writing*. Eight coloured images, four each of characters and objects, surrounded the textual element of the prompt.

The prompt was relatively open-ended, allowing students to base their writing on any combination of the images provided, or composing their own *adventure* around invented characters or objects.

Markers for this Writing test 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, including a prescribed percentage of scripts to be double-marked, and the daily application nationally of *control scripts* for all markers. As part of the Queensland marking operation for 2016, referee marking continued, further ensuring marking reliability. There was also provision for appeal over individual Writing test scores once test results were released. On appeal, a student's script is re-marked independently by two senior Writing test markers. The NAPLAN Narrative writing marking guide is available at www.nap.edu.au.

Performance

Anecdotal evidence from markers indicated that students in Years 3 and 5 were comfortable with the writing prompt, *Imagine.* The eight images provided were widely adopted by students as the basis for their narratives. There was a significant trend for students to 'tour the stimulus', particularly at Year 3. This approach has occurred in earlier NAPLAN Writing test prompts where multiple images were displayed. Those students who diverged from the images provided on the prompt tended to write more challenging narratives.

As to be expected for these age levels, many students adopted fairly straightforward recounts of events, or where complications did exist, they were often not substantial; i.e. the complications did not drive the narrative forward with any great degree of potency. Many narratives centred around the magical, with fantastic situations involving genies, bizarre creatures, portals, transformations and re-transformations. Conclusions often involved reversion to the status quo in the characters' lives, with the amazing experience completed.

Students in Year 3, and to a lesser extent in Year 5, wrote in fairly straightforward sentence forms, with compound sentences common. The use of '*and'* or '*and then'* detracted from student performance. The NAPLAN Narrative Writing test rubric rewards complexity in sentence form. That is not to say that simple sentences cannot be used to effect, nor the judicious use of sentence fragments. However, students should be encouraged to explore the range of sentence structures. One advantage of including complex sentences with adverbial and adjectival clause structures is that it allows the writer 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. An enhanced use of conjunctions and text connectives strengthen the cohesive structure of the narrative.

In terms of length of text, students in Years 3 and 5 tended to write more than the persuasive texts of previous years. Though this was encouraging, markers also would have liked to have seen tighter scripts, with greater precision in vocabulary. Students who were able to make use of a well-chosen adverb, adjective or nominal group could write with fewer words but with more demonstrable control of language.

The early development of a writer's voice, even in a demand writing task such as NAPLAN, should not be underestimated. Regular classroom writing should be encouraged to address this aspect of student writing in the early years and beyond.

References

Australian Curriculum, Assessment and Reporting Authority 2013, *Australian Curriculum: English,* www.australiancurriculum.edu.au.

Queensland Curriculum and Assessment Authority 2013, *Hidden worlds,* www.qcaa.qld.edu.au/downloads/p_10/3579_wt_hidden_worlds.pdf.

Queensland Curriculum and Assessment Authority 2011, *Queensland's Literacy Test: A framework for describing spelling items,* www.qcaa.qld.edu.au/downloads/p_10/3579_describing_spell_items.pdf.

Writing task sample

Year 3 — Frog named Lily

Once apon a time, there was a little frog nameed Lily who lived in a dark stinking sewer with all the other frogs. They were sweet liitle green ones with shining eyes. not disghusting broum cane toads. Lily was very adventurous and loved to explore the sewer. Her parents did not like her wandering and begged her to stop, but she would not listen. She was not contented with her life and it was made worse by the fact that it would always stay that way. And it didn't change, not until she found the boat anyway...

It happened one cold day. Lily was exploring, which was no surprise, when she saw a strange light glimmering faintly in the pipe ahead. "What could it be?" wondered Lily out loud. She frog-hopped towards it and saw a small, red boat bobbing on the putrid water.

'Red-Tail' was written on its side and two wooden oars were lying inside it. The curious frog jumped into it and started to look around. Suddenly, a wave flung itself against the boat and carried it away, with Lily inside it!

She screamed, as you would too if you were in her situation. Lily was being swept towards a giant waterfall! When the she reached it though, she didn't crash and die, instead the boat sprouted wings and flew up up and away. "I am a magic boat, Lily." boomed a friendly voice. "You have nothing to fear." Thankyou for saving me, boat." replied Lily. "Now, could you help me again?"

A few minutes later, all the frogs were flying away in the boat, who had magically expanded. They flew over rivers,

streams and fields until they reached a crystal clear pond. The magic boat had saved them all! "Thankyou, boat!" called all the frogs. "Just call me Red-Tail!" it replied. ~~They all lived~~

Year 3 Commentary — Frog named Lily

This charming story by a younger writer traces the adventure of Lily, a frog forced to live in a *'stinking sewer'* but who ultimately finds a new life in a *'crystal clear pond'* by story's end. Lily's inquisitive nature leads her to a potentially life-threatening situation, but the magical quality of the boat she found herself in, steered her and her frog fraternity to a safer future. The text shows a sound structure, with the general curiosity of Lily driving the narrative to the point of finding the boat, and the magical consequences that followed.

One notable feature of the text is the writer's identifiable voice, as she not only develops the narrative, but also engages the reader with the use of rhetorical asides *'which was no surprise', 'as you would too if you were in her situation',* and a gentle humour, *'She frog hopped towards it', 'They were sweet little green ones with shining eyes, not disgusting brown cane toads.'*

The text did not stretch into the area of theme (an unlikely attribute of Year 3 writing) but a clear narrative structure with a central idea — Lily's fortunate escape to a better world following some magical intervention — was evident. Vocabulary showed some developing precision, with several very expressive examples (*putrid water, sprouted wings, magically expanded*). Spelling was commensurate with this level of vocabulary.

Sentences demonstrated variety in form and length, and were highly accurate in structure. The use of time connectives (*Suddenly, A few minutes later*), and continuatives used in an original way, (*And it didn't change, not until …*) provided a sense of cohesion to the storyline. Punctuation, too, was generally accurate, including the correct use of other punctuation such as direct speech.

Year 3 Literacy

Language conventions

Spelling — Results and item descriptions

The percentage columns give the facility rate (percentage correct).
These results are based on provisional data.

Item	Answer	Qld%	Aust%	Description
Proofreading — error identified				
1	spot	91.3	92.2	Correctly spells a one-syllable word ending in the single consonant *-t*.
2	black	85.6	86.3	Correctly spells a one-syllable word ending in the consonant digraph *-ck*.
3	jumping	85.3	86.3	Correctly spells a two-syllable word with the inflectional ending *-ing* requiring no change to the base word.
4	bread	77.1	78.6	Correctly spells a one-syllable word with the short vowel digraph *-ea*.
5	dry	64.9	67.8	Correctly spells a one-syllable word ending in the diphthong *-y*.
6	teaspoon	69.3	71.1	Correctly spells a two-syllable compound word with a long vowel digraph *-ea*.
7	nice	69.6	72.8	Correctly spells a one-syllable word with the fricative *-c*.
8	supermarket	64.4	67.4	Correctly spells a four-syllable word with the etymological element *super-*.
9	corner	61.6	62.8	Correctly spells a two-syllable word with the unstressed ending *-er*.
10	gentle	35.1	37.9	Correctly spells a two-syllable word starting with an affricative *-g*.
11	button	38.6	44.3	Correctly spells a two-syllable word with the unstressed ending *-on*.
12	departments	35.4	39.1	Correctly spells a three-syllable word with the medial consonant *-t*.
13	limbs	13.7	17.3	Correctly spells a one-syllable word with the terminal silent letter *-b*.
14	probably	8.0	9.7	Correctly spells a three-syllable word with a medial schwa.
Proofreading — error not identified				
15	forest	57.8	60.5	Identifies an error, then correctly spells a two-syllable word with the single consonant *-r* at the syllable juncture.
16	splashes	49.8	51.6	Identifies an error, then correctly spells a two-syllable word with the inflectional ending *-es* requiring no change to the base word.

Item	Answer	Qld%	Aust%	Description
17	whales	29.4	33.9	Identifies an error, then correctly spells a one-syllable word with the consonant digraph *wh-*.
18	growl	30.5	32.1	Identifies an error, then correctly spells a two-syllable word with the diphthong *-ow*.
19	machine	22.9	28.3	Identifies an error, then correctly spells two-syllable word with a fricative *-ch*.
20	lizard	42.3	47.4	Identifies an error, then correctly spells a two-syllable word with the medial fricative *-z*.
21	stain	22.1	24.0	Identifies an error, then correctly spells a one-syllable word with the diphthong digraph *-ai*.
22	mouths	25.3	29.6	Identifies an error, then correctly spells a two-syllable word with the inflectional ending *-s* requiring no change to the base word.
23	untied	11.7	13.6	Identifies an error, then correctly spells a two-syllable word with the inflectional ending *-d* requiring no change to the base word.
24	biscuits	5.9	7.9	Identifies an error, then correctly spells a two-syllable word with the neutral vowel (schwa) represented by *-ui*.
25	sensible	5.4	7.8	Identifies an error, then correctly spells a three-syllable word ending with *-ible*.

Spelling — Key messages

Performance

In general, Year 3 students should have moved beyond the letter-name of alphabetic stage of spelling development and should be working in the within-word stage where they learn how sounds are coded with patterns of vowels or consonants. Good spellers make decisions based on knowledge of the sequences and locations of letters in relation to other letters and the frequency of letter patterns. In addition they think about the meaning and origin of the base or root word onto which prefixes, suffixes or verb endings are attached (e.g. *department*, *splashes*) as well as the conventions for adding inflectional endings (e.g. *untied*, *mouths*).

Students in Year 3 are becoming aware of the three layers in the orthographic system of spelling:

- the sound/symbol and pronunciation layer
- the syllable/word function layer
- the meaning layer.

As in 2015, there was a strong focus on the knowledge of more sophisticated and unusual aspects of **vowel patterns**, e.g.

- long-vowel digraphs in a compound word as in *teaspoon*
- diphthong digraphs in one syllable words as in *stain* and *growl (*where the sound glides from *-a* to *-i* and from *-o* to *-w)*
- the neutral vowel (or schwa) as in *button* and *corner* and in *biscuits* (which had a very low 5.9% facility rate).

There were also **consonant patterns** that were equally challenging, e.g.

- consonant digraph at the beginning of a word as in *whales*
- *-ch* sounding like *-sh* as in *machine*
- unheard consonants as in *lim**b**s and depar**t**ment*.

Multipart words also proved very challenging for Year 3 students, e.g. inflections and affixes as in *untie/untied*, *mouth/mouths*, *sense/sensible* and *probable/probably*.

The omission rates throughout the test increased from 0% for the first two items to 15% for the last item, *sensible*. This word also had the lowest facility rate of 5.4% making it clear that the general rule of whether to use *-able* or *-ible* as an adjective ending is an important teaching point for students. For the remaining words where the error was identified, the omit rate varied from 2% to 7%. For the last five items where the incorrect spelling was unidentified, the omission rate varied from 10% to 15%.

Queensland Year 3 students performed well (77% to 91% facility rates) for the first four error-identified items of the test. Results were slightly below the national average for spelling:

- the one-syllable word, *spot,* with a short vowel *-o* in the middle of the word
- the word *black* ending in a consonant digraph *-ck*
- the word *bread* with a short vowel digraph *-ea*
- the word *jumping* where no change to the base word was required after the ending.

Year 3 students performed reasonably well (40% to 70% facility rate) spelling:

- words with a final long vowel as in *dry*
- words with the soft consonants *-c* (*nice) and* soft *-g (*in *gentle,* which posed more difficulties for students with only a 35% facility rate)
- multisyllabic words with a suffix as in *supermarket* (*super* is a common prefix)
- words with open first syllables (the *li* in *lizard*)

They also performed reasonably well at the harder requirement to both identify and spell:

- a word with a single consonant *-r* at the syllable juncture as in *forest*
- a word with an inflectional ending *-es* where there is no change to the base word as in *splashes*.

It is interesting that there was a wide range of facility rates for words where no change to the base word occurred when an inflectional ending was added, e.g. *jumping* was very well done but the words *mouths* and *untied* posed much greater difficulty as students had to first identify and then correct the words. These items had facility rates of 25% and below.

Implications for teaching

Testwiseness is an ongoing concern. Testwise students know to avoid being misled by the way the target words are misspelled. Many students are so distracted by the provided misspelling that they reproduce the misspelling exactly. The influence of the provided misspelling is also seen in the error patterns that students produced when trying to spell *departments* (Item 12). All lack the letter *-t*, due at least in part to the provided misspelling of that word.

The ability to apply spelling knowledge to proofreading is a difficult activity for Year 3 students but it is essential that they practise drawing on their knowledge about the spelling system in a strategic and systematic way. A much lower performance on the error-unidentified items shows how difficult

this is. Teachers can support students with direct and focused teaching. This knowledge can be built by using learning strategies such as look-cover-write-check or by asking students to remember and use specific word features such as sequence, frequency and position of letters. Spelling lists which have patterns of spelling, (such as the diphthong *-ai* is usually found in the middle of words as in *stain* (Item 21) whereas the vowel digraph *-ay* as in the word *day* is usually found at the end of a word), are also a useful learning strategy.

Year 3 students need to move beyond the strategies of mapping sounds to single letters and learn about the sequencing of vowel and consonant patterns, the positions in which they occur and the probability with which they will occur. For example, the digraph *-ea* acts as a short vowel in the word *bread* but in the word *teaspoon* the same vowel combination acts as a long vowel digraph. They need to reminded that *-y* can operate as a long vowel at the end of a word as in Item 5 *dry* but it can also operate as a consonant in other words such as *yet* and *yellow.* Consonant digraphs and letters can also have different sounds depending on whether they are soft or hard. Three items targeted this. In Item 19, *machine*, the *-ch* digraph sounded like *-sh* and not *-ch* as in the words *chug* and *change*. In Items 7 and 10, students had to recognise that sometimes consonants can have a soft sound as in *nice* and *gentle* whereas *cake* and *gamble* have hard sounds for the same letters.

It is clear from the extremely low facility rate for *sensible* (Item 25) that students would benefit from lessons about suffixes generally but also specific advice about whether to use *-able* or *-ible* as adjective endings. Generally, *-ible* is usually added to a non-word or an incomplete word (usually a Latin root fragment such as *sens* which is derived from the Latin root *sensibilis,* meaning perceptible by the senses or the mind) rather than a complete word such as *payable* or *doable*.

Even though there were few homophones this year (*bred/bread, wales/wails* and *tied/tide*), Year 3 students need to be taught about the influence of meaning on spelling. The word *tea* is easily spelled yet students struggle to spell *teaspoon* (Item 6) because they have not learned that meaning and spelling are linked. Words that sound the same but have different meanings are spelt differently, as in *witch* and *which*. However words with similar meaning will maintain that spelling even if the pronunciation changes. In the word *depart* the consonant *-t* is sounded but in the word *department* (Item 12) the *-t* in the middle consonant is unstressed.

Three items targeted unstressed syllables at the end of words as in *biscuits, button* and *corner*. In many two-syllable words the first syllable is heavily stressed and the second syllable is unstressed to the point that the vowel becomes neutral, like a schwa. Children must learn that there is no way to ‘sound out’ a schwa. Instead, they have to know typical within-word letter patterns.

Students have a big advantage if they can spell with the aid of morphological and basic etymological knowledge, leading eventually towards knowledge of Greek or Latin elements. Students, who over-rely on phonetic spelling (or how the word sounds), may lose sight of the base word. Although the middle vowel in *probably* (Item 14) is neutral-sounding, students should also know the word prob**a**bility, in which the short /a/ sound is more recognisable. The word *supermarket* (Item 8) has the prefix *super* which is derived from the Latin root *super* meaning above, over or beyond. A supermarket is a place which exceeds the normal level of a market in that it has a great variety of shops beneath one roof. Learning about Latin prefixes and suffixes makes the spelling of longer words easier. If, in addition, students can recognise the base word, they have a strong strategy for spelling which frees them from an over-reliance on phonetic spelling.

The conventions for adding inflectional endings and other suffixes make an important teaching point. Students need to be taught the conventions for adding plural and tense endings, as well as the conventions for showing continuous or completed actions. There was a high facility rate for Item 3, *jumping*, where the inflectional ending *-ing* (indicating continuous action) requires no

change to the base word. We add *s* to make a plural noun (e.g. Item 22, *mouths*). But if the word ends with *-sh, -x, -z, -ch,* or *-s*, the plural of nouns and the present tense of verbs is usually formed by adding *-es* (e.g. Item 16, *splashes).*

To form simple past tense of a word ending with *-e*, we drop the *-e* and add *-ed* (e.g. Item 23, *untie/untied)*. This applies to any ending that begins with a vowel suffix (e.g. *-ing*, *-ed*, *-er*, *-able*, *-ous*). Because *tide* and *tied* are homophones, many students would not have been able to recognise this word as misspelt, resulting in this item having a very low facility rate of 11.7%. Homophones involve the third layer in the spelling orthographic system of meaning.

Please refer to SunLANDA for a detailed analysis of individual test items, including teaching ideas designed to assist with the development of the understanding and skills required by each item. SunLANDA is available to all schools on the QCAA website.

Grammar and punctuation — Results and item descriptions

The percentage columns give the facility rate (percentage correct). These results are based on provisional data.

Item	Answer	Qld%	Aust%	Description
26	B	94.5	94.9	Selects an adverb of place to modify the verb in a simple sentence.
27	C	94.1	94.4	Selects the correct preposition to introduce an adverbial phrase.
28	B	81.8	82.4	Selects the correct modal verb to complete a simple sentence.
29	C	81.6	82.4	Identifies the correct dummy subject and verb for a complex sentence.
30	C	70.1	71.7	Selects the subject–verb contraction that best fits the meaning and structure of a complex sentence.
31	A	65.4	67.7	Identifies the correct use of an exclamation mark in a simple sentence.
32	B	71.5	70.6	Identifies the word describing a verb in a simple sentence.
33	C	68.2	69.8	Identifies the verb which agrees in tense and number with the subject in a simple sentence.
34	A	72.4	72.6	Selects the modal verb that fits the meaning and structure of a compound sentence.
35	B	59.5	61.1	Identifies a noun in a simple sentence.
36	D	57.0	59.0	Identifies that a proper noun needs a capital letter.
37	C	52.0	54.9	Identifies the correct punctuation of direct speech with internal attribution.
38	C	50.8	51.3	Identifies the correct use of commas to punctuate a list in a simple sentence.
39	D	57.0	57.4	Identifies the sentence that is structured as a question.
40	D	57.3	58.4	Identifies the correct use of a coordinating conjunction.
41	B	56.0	56.8	Recognises an independent clause in a complex sentence.
42	D	46.9	47.6	Recognises the correct sequence of tenses in a complex sentence.
43	B	40.3	37.1	Identifies the correctly punctuated contraction in a complex sentence.
44	A	40.2	38.4	Identifies an adjective in a simple sentence.

Item	Answer	Qld%	Aust%	Description
45	B	45.0	45.5	Recognises the correct compound subject to replace a plural pronoun in a simple sentence.
46	C	37.4	38.0	Selects a sentence with the correct subject–verb agreement.
47	A	36.7	37.8	Recognises a past tense verb in a simple sentence.
48	D	29.2	30.3	Recognises the correct capitalisation of common and proper nouns.
49	B	40.8	39.5	Identifies the reference for a pronoun in a compound sentence.
50	D	32.2	33.0	Identifies a sentence with the correct use of an indefinite article.
51	D	28.2	27.7	Identifies the correct use of an apostrophe of contraction in a simple sentence.

Grammar and punctuation — Key messages

The NAPLAN grammar and punctuation items test some sentence-level, clause-level and word-level skills. The test does not cover the curriculum. Instead, it tells how a large number of students perform on a small range of tasks. Standardised tests can however suggest broad trends across a cohort. At the level of individual students, NAPLAN results can supplement classroom assessments and guide teachers in what important points of grammar and punctuation need revisiting.

For information about the full range of grammar knowledge Year 3 students should have, refer to the Australian Curriculum English. A more systematic and detailed scope and sequence of grammar topics for Year 3 students can also be found in *Grammar—Years 1 to 9* (QCAA 2007, https://www.qcaa.qld.edu.au/downloads/p_10/qcar_ss_english_grammar.pdf).

Notable in this year's test were questions about:

- **sentences**: recognising different types of sentences, e.g. statement, command, exclamation and question (Items 31 and 39)
- **clauses**: distinguishing between main and subordinate clauses (Items 41 and 42) and coordinating conjunctions (Item 40)
- **verbs**: identifying tense (Item 47), identifying the correct subject-verb agreement in tense and number (Items 29, 33, 34 and 46), sequence of tense across clauses (Item 42), contractions (Items 30, 43 and 51) and modality in the verb's auxiliary (Items 28 and 34)
- **parts of speech**: names (Items 35 and 44), functions (Items 26, 27, 32 and 50) and matching a pronoun to its reference (Items 45 and 49)
- **punctuation**: for direct speech (Item 37), for capitalising (Items 36 and 48), and for listing (Item 38)

Performance

Like those in other year levels, the results of Queensland Year 3 students in grammar and punctuation were just below with the Australian mean scale and comparable with other state jurisdictions such as Tasmania and South Australia. The only states above the national mean scale were New South Wales and Western Australia.

The usual wide gap in performance in favour of females is present with the exception of Item 44 where students had to identify an adjective although both sexes struggled with the hard items. The item with the greatest gender disparity (10%) was Item 39 which asked students to identify a question. The facility rates tended to be low for the items that involved parts of speech (i.e. names,

functions and being able to match a pronoun to its reference). It is clear that students need exposure to the metalanguage of grammar and punctuation, e.g. past tense, adjective, pronoun, noun, capital letter. As in all paper tests, the later items are hardest. Items 42 to 51 had facility rates of less than 50% and the highest omission rates, varying from 4% to 6%.

Implications for teaching

Grammar and punctuation is not a separate area but a component of reading and writing. Although NAPLAN tests grammar and punctuation at the level of single sentences, this is not the way to teach or assess these skills in the classroom. Rather, teach how a sentence fits into a wider text as this will influence choices about the sentence's pronouns, its verb tense, its order of components (subject, verb and object) and its elaborations.

Teachers are encouraged to revisit things that NAPLAN targets, e.g.

- **types of sentences**: Simple, compound and complex and the difference between the main clause and subordinate clauses within a compound or complex sentence.
- **verbs**: Tense, agreement with the subject, modality (the degree of obligation or frequency), changing verb tense across clauses, e.g. perfect tense to the past perfect tense and contractions (both forming and breaking into component parts for more formal language). It is a great gift for a student to have the rules governing contractions and possession clear in the early years before this error becomes set as an incorrect pattern which they may carry right through schooling.
- **parts of speech**: Even in the early years, students need to learn the metalanguage of grammar and punctuation so that they can identify and understand why a sentence is ungrammatical, not just because it 'sounds wrong'. The low facility rates for the items that required students to know the names of parts of speech (e.g. adjective, adverb, contraction, apostrophe) point to an important area where explicit teaching is needed. Before teachers and students can talk about the more engaging challenges of constructing a rich and coherent text, they must be able to identify and name the building blocks of sentences and know how to use them.
- **irregular indefinite articles with words beginning with** ***-u:*** 'U' words that sound like *-uh* conform to the usual rule of changing *-a* to *-an*, e.g. *an unusual idea*, *an umbrella*. However words beginning with *-u* that sound like *-yoo* do not follow the usual rule of *-an* before a word starting with a vowel, e.g. *a unicorn, a uniform, a unilateral decision*.
- **punctuation**: Students need direct teaching on when to use commas (not just to put one in if it sounds like a pause), e.g. how to use commas with listing (Item 38)and with internal attribution (Item 37).
- **capitalisation**: Many Year 3 students are still unsure of sentence boundaries and when to capitalise for a new sentence. The test indicates that students also struggled with capitalising common and proper nouns (Items 36 and 48)
- **combining sentences**: Students need to practice different ways of combining sentences in the continuous progression from spoken speech to written speech, e.g. *John has broken his arm. He won't be able to go to the picnic.* These sentences could be combined as:
  - *Because John has broken his arm, he won't be able to go to the picnic.* (adverb clause of reason)
  - *Having broken his arm, John won't be able to go to the picnic.* (participle phrase)
  - *John, who has broken his arm, won't be able to go to the picnic.* (inserted adjectival clause).

Many of the points above need to be taught and then revisited more than once. Students need practice in proofreading so that they are able to proofread their work. It is also important to expose

students gradually to exemplary texts and point out how a sentence can be crafted, balanced, given pace and rhythm and contribute to the tone or meaning of the whole text.

Testwiseness

To combat the problem of students facing many hard questions throughout the last part of the test, it is important to ensure students understand the more complicated formats and features of those more difficult items. Students would also benefit from being taught techniques for maintaining persistence and being systematic.

Although NAPLAN is a test of written, standard, Australian English, it often uses example sentences that seem to be from informal, spoken situations. Familiarity with diverse types of texts may help students to be more confident in viewing the NAPLAN items. Guide students through notable grammar and punctuation in a wide selection of reading materials, including texts that are challenging and divergent in form.

Please refer to SunLANDA, which is available to schools via the School Portal on the QCAA website through the school BIC and password. The SunLANDA program displays the school's results but also links to detailed analysis of every item on the NAPLAN test. The analyses include Australian Curriculum links, language resource texts and other QCAA materials. The item analysis is also available collected into PDF format on the NAPLAN pages of the QCAA website.

A detailed scope and sequence of teaching grammar and punctuation can be found in *Grammar—Years 1 to 9* (QCAA 2007, https://www.qcaa.qld.edu.au/downloads/p_10/qcar_ss_english_grammar.pdf).

Reading

Results and item descriptions

The percentage columns give the proportion of correct answers (facility rates).
These results are based on provisional data.

Item	Answer	Qld%	Aust%	Description
Boots the cat				
1	A	91.7	92.1	Locates stated information in a simple narrative.
2	D	90.8	90.8	Infers meaning in a simple narrative.
3	D	92.8	93.4	Infers a character's response in a simple narrative.
4	B	88.8	89.8	Locates directly stated information in a simple narrative.
5	A	78.2	79.7	Identifies a detail in a simple narrative.
6	A	65.5	66.8	Interprets textual information to make an inference in a simple narrative.
Seahorses				
7	D	78.4	79.2	Locates a fact in an information text.
8	B	85.8	86.7	Locates a fact in an information text.
9	D	86.5	87.3	Locates a fact in an information text.
10	C	69.4	70.2	Identifies the main idea of a paragraph in an information text.
11	B	63.6	64.3	Identifies the reason for including a photograph in an information text.
Bamboozled!				
12	D	80.8	83.7	Locates a fact in an information text.
13	A	61.4	63.4	Interprets a detail in an information text.
14	B	79.0	80.3	Interprets a detail in an information text.
15	A	46.4	47.4	Locates a fact in an information text.
16	C	57.7	60.0	Interprets information to make an inference in an information text.
17	A	82.0	83.9	Locates a fact in an information text.
18	B	52.6	54.1	Identifies the main purpose of an information text.
Letter to Amy				
19	C	44.7	47.8	Synthesises a persuasive letter to identify a personality trait.
20	A	67.5	68.7	Identifies the method of persuasion in a persuasive letter.
21	B	54.6	57.3	Locates a fact in a persuasive letter.
22	C	70.0	71.6	Locates a fact in a persuasive letter.
23	D	35.6	36.0	Infers the reference for an expression in a persuasive letter.
24	B	65.2	66.1	Infers the meaning of a character's statement in a persuasive letter.
25	D	28.6	29.8	Identifies an example of hyperbole in a persuasive letter.

Item	Answer	Qld%	Aust%	Description
Library magician				
26	C	41.9	42.2	Interprets a detail in a narrative.
27	C	52.2	52.0	Identifies a key idea in a narrative.
28	A	68.8	70.4	Interprets character in a narrative.
29	B	73.8	75.8	Interprets a detail in a narrative.
30	D	57.6	59.7	Analyses use of exclamation marks in a narrative.
31	D	28.1	28.0	Analyses figurative language in a narrative.
32	C	65.7	67.3	Interprets character in a narrative.
Bats				
33	D	20.7	20.6	Infers the meaning of a word in context in a multi-text.
34	A	55.9	59.9	Locates a fact in a multi-text.
35	D	42.4	44.2	Interprets details in a multi-text.
36	C	50.7	53.3	Interprets a fact in a multi-text.
37	WR	12.8	13.5	Identifies the basis for a classification in a multi-text.
38	C	29.5	30.3	Identifies how text organisation reflects two different purposes in a multi-text.

Key messages

In 2016 the Year 3 Reading test consisted of 38 items which were based on six reading magazine units spanning the genres of **information** — three texts, *Seahorses* (the simplest), *Bamboozled*! (more complex) and *Bats* (a report on the differences between two species of bats); **persuasion** — *Letter to Amy* (a persuasive letter); and **imaginative narrative** — two texts, *Boots* (a simple narrative/recount) and *Library magician* (a quite challenging narrative). There was one very challenging short-response item for year 3 in the unit *Bats* which had a very high omission rate of 12%.

Though the performance of Queensland students was marginally below the national facility rate, 95.4% of our students performed above the national minimum standard for reading, compared to a national figure of 95.1%. Girls outperformed the boys in all items, sometimes significantly. The gender disparity was greater in the two narrative texts (5% to 7% in favour of girls) and in the persuasive text (5% in favour of girls).

Teachers can view school-specific performance information through the QCAA's SunLANDA program. SunLANDA is available on-line through the School Portal on the QCAA home page. State schools can also access this content through *OneSchool.* SunLANDA displays the performance of classes, subgroups, and individuals within the school and compares the school's performance with that of the state and nation. Most importantly, hyperlinked to each item are the analyses and teaching ideas to help teachers and students with each type of item.

Performance

There was a pattern of increasing level of difficulty across the reading test. The high facility rate pattern of *Boots* is typical of an entry-level text, with four of the six items being simple literal item types. The next text in the paper, *Seahorses*, had a pattern of a high to medium facility rates across most items and this was mainly because four of the five items were literal items. Even though the text *Bamboozled!*, which was linked with Year 5, had a high proportion of literal items, there was an overall pattern of medium facility rates for most items. Two items had low facility

rates. Item 15, with the rate of 46.3%, required a close reading of the stem (*bamboo **fibres** are used in the construction of* …). Even though this was a literal recall item, many students read this as *bamboo* not *bamboo fibres*. The second item which challenged many students was Item 18 which had a facility rate of 53%. It asked them to identify the main purpose of the text. Once again they had to pay close attention to the words in the stem, the **main** purpose of the text, *(*its uses and interesting facts about bamboo)*,* as many students were distracted by the secondary purpose which had a persuasive element*.*

The last three texts on the paper were more difficult*.* The persuasive letter, *Letter to Amy*, included two items which involved the students being able to understand the text as a whole in order to answer the item, e.g. to identify the mood or character trait of Alex (Item 19) and to work out that Amy lives in the city, a long way away from Alex at Coober Pedy (Item 23). Students had a lot of trouble with Item 25, which asked them to identify exaggeration or hyperbole, paying attention to the exclamation mark and the over-the-top claim *that you will **ever** have in your **entire** life*.

The last multi-text, *Bats,* had a pattern of low facility rates for all of its items, most of which were inferential. In addition, the items in this text had the highest omission rates of all. Omission rates varied from 4% to 12% for short-response Item 37. The two items with which students had most difficulty were Item 33, where they had to understand that vocabulary can have a specific meaning when used in a classifying context, and Item 37 which asked them to differentiate between two species of bats. To do this they needed to read the first classifying sentence very carefully when it identifies that the broad classification of the two groups is determined by *diet and navigation*. Then they needed to check this against the information in the columns Microbats and Megabats to verify if this in fact is the focus of difference and not size.

Generally items that involved purpose, tone and character responses had lower facility rates than literal and lower-order inferential items. This is because they required higher-order reasoning and comprehension (i.e. students had to form an understanding of the whole text as well as pay attention to subtle clues in the text which help them make the inferences).

Implications for teaching

This year as usual, year 3 students demonstrated a high capacity to answer literal (recall and translation) type items. Unfortunately, there were only 15 items of this type out of 38 on the paper, and most of these (12) were in the first three texts in the test. This demonstrates the importance of giving students strategies to help them make inferences as they read, i.e. to make statements about the unknown based on the known.

As a general note, all items involving purpose, main idea, theme or tone of the text (in whole or part) challenge students because they have to understand the whole of the text in order to answer the item. The big challenge for teachers is to get students to read a variety of texts, annotate them in the classroom and discuss the ideas in the texts in groups so that they can see how all the parts of the text contribute towards the meaning of the whole. They need to see connections between ideas in the text and their own knowledge and experience as well as connections between ideas in the text. This is the time to discuss patterns in the text (e.g. cause and effect, contrast, comparison), identify two or three main sections of the text and the main idea in each part, as well as how the parts contribute to the overall meaning. All of this should occur before students begin a close study of the text. At Year 3, this structural knowledge and approach needs to be activated delicately, with a number of students still grappling with decoding issues.

Students will handle the distractors in the items much better if they are clear about the subject matter and the purpose of the text before they proceed to the items**.**

Students need to practise reading short narrative, persuasive and multi-text (e.g. a report) extracts. The poor result for a simple report with clear layout and lots of repetition would indicate that

students need more practice with classifying multi-text genres. They need practice in identifying the essential part of a multi-text (the first sentence) and the trivial part of the report (*Did you know?* which is intended as optional reading). They need to be alert to the mix of visual cues (photographs, graphs and diagrams) that accompany and reinforce the written text.

Students need practice with persuasive texts as they need to notice how modality is managed by the writer and how this affects certainty and obligation. Reading tone, mood and purpose are always very challenging for students in persuasive and narrative texts at all levels. Students should be encouraged to annotate with a pencil in hand, highlighters to identify main ideas, visual and text features (e.g. figures of speech, use of data). It is not too early to get 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 contrasts within the text.

Teaching students to identify the two or three main parts of a text and how to locate the main idea in each part before synthesising the main idea into the writer's purpose are important ongoing skills for students. This skill is targeted in Item 38, where students had to identify the main idea from two sections of the text: *Types of bats* and *Did you know?*. The section, *Types of bats* includes the photographs of an insectivorous bat and a frugivorous bat, whose navigation and diet are described in the written text.

Teachers need to encourage students to read for pleasure and recreation in order to extend their knowledge of themselves and the world around them. Reading develops empathy for characters and people in difficult situations. The complexity of the reading process is made visible when students discuss texts and share how they arrive at their personal understanding of the text. Students need to experience using extracts where everything in the text is not clear, e.g. sometimes a character's motivation is not clear, and learn not to panic if the subject matter is not completely accessible, as in *Library magician*.

Teachers are the facilitators of this process of annotating and discussing texts; they are not the leaders. **Their** focus should be on:

- modelling a love of books and reading
- finding authentic texts which appeal to children of that age
- providing a range of genres and a range of narrative texts, from traditional texts to texts with post-modern elements
- promoting higher-order iteming of texts
- reading aloud to students to promote reading for pleasure
- developing an awareness of how the parts of the text combine to create a whole through both semantic (links between the ideas) and syntactic (grammatical links) cohesion
- encouraging students to make inferences as they read (an informed guess backed by evidence from the text)
- encouraging students to see connections between the text and their own knowledge and experience, between different things within the text and between this text and other texts in a similar genre or on similar subject matter
- encouraging students to be active readers and make connections between the text and their own knowledge, experience and feelings.

QCAA resources

QCAA 2015, *Beyond NAPLAN How to read challenging texts*, Beyond NAPLAN series, www.qcaa.qld.edu.au/downloads/p_10/naplan_read_challenging_texts.pdf.

Year 3 Numeracy

Results and item descriptions

The numeracy strands are abbreviated as follows: *number and algebra* (NA); *measurement and geometry* (MG); *statistics and probability* (SP). All items are worth one score point. For the purpose of this report, the SUNLANDA strands of *number and algebra*, *functions and patterns* have been combined as *number and algebra* to reflect the Australian Curriculum strands.

The percentage columns give facility rates (percentage correct). These results are based on provisional data.

Item	Strand	Answer	Qld%	Aust%	Description
1	NA	C	98.6	98.7	Counts arrays of stars in groups of 5.
2	MG	A	89.8	89.4	Compares the lengths of two strings using paper clips as a unit.
3	NA	C	85.8	86.4	Counts money by tens.
4	SP	D	93.1	93.4	Interprets a bar graph showing the number of people with each eye colour.
5	MG	B	77.6	78.9	Combines two common shapes to create a new shape.
6	NA	D	75.4	77.8	Solves a simple word problem using basic multiplication facts.
7	MG	A	76.7	74.1	Identifies the clock that shows half-past the hour.
8	NA	100	76.0	79.0	Counts a mixed collection of dollar notes.
9	SP	47	71.5	72.4	Counts tally marks in a table.
10	NA	B	72.7	75.4	Identifies a number greater than 324 but less than 342.
11	MG	D	70.7	70.0	Identifies the three-dimensional object that can be made from a net.
12	MG	C	66.7	67.3	Identifies a missing object in a pattern of quarter turns.
13	MG	15	54.8	57.1	Calculates the mass of an object on a balance scale using subtraction or addition.
14	NA	B	66.9	68.5	Represents the word form of a four-digit number with numerals.
15	SP	B	66.7	67.4	Selects the correct picture graph to display given data.
16	NA	C	60.6	64.1	Represents multiplication as repeated addition.
17	SP	B	62.3	64.4	Describes the likelihood of the outcome of a practical activity.
18	NA	B	64.1	63.3	Selects the image showing the set separated into groups of three.
19	NA	C	45.6	46.5	Selects a word problem which matches a given multiplication number sentence.
20	MG	C	49.8	51.8	Compares the volumes of four containers using a cup of water.
21	NA	C	46.7	50.5	Solves a problem using division facts of 5.
22	MG	D	50.1	47.4	Identifies a cell on an unlabelled map using the given locations of other landmarks.

Item	Strand	Answer	Qld%	Aust%	Description
23	NA	A	37.2	41.1	Solves a word problem by adding three amounts of money and subtracting to calculate change.
24	MG	D	42.6	45.1	Uses the array structures to determine the square with the largest area shaded.
25	MG	D	43.8	45.4	Compares the masses of four objects using graphical displays of balance scales.
26	NA	A	40.0	41.1	Uses the connection between addition and subtraction to identify the appropriate subtraction number sentence to solve a word problem.
27	SP	C	36.8	38.1	Recognises that a coin flip is not affected by previous flips.
28	NA	C	32.0	34.7	Identifies the missing number in a pattern made by counting by 3s.
29	NA	D	31.5	32.1	Solves a word problem using clues about place value.
30	NA	A	34.1	35.2	Identifies the correct addition fact related to a given subtraction fact.
31	NA	A	27.0	28.2	Adds and subtracts unit fractions with related denominators, to make a whole.
32	MG	A	20.2	21.1	Uses a graphical representation of a ruler to measure length in cm, not starting at 0.
33	NA	B	22.2	23.9	Uses partitioning to make an equivalent number sentence.
34	MG	28	4.6	5.5	Uses the features of a rectangle to solve a problem.
35	NA	21	4.4	5.6	Uses basic number facts of subtraction and division to solve a problem.

Key messages

Performance

The Year 3 numeracy test covers concepts and skills from across the strands. This year there were 18 *number and algebra*, 12 *measurement and geometry* and 5 *statistics and probability* items. Approximately 83% of items were multiple-choice, with the remaining requiring students to construct their answers. While the majority of students attempted to answer all items, a number omitted the more challenging items toward the end of the test. These items are generally designed to differentiate student performance — to provide opportunities for higher performing students to demonstrate their ability.

This year 96% of Queensland Year 3 students scored at or above the national minimum standard, the second highest percentage in Australia. There were also several items where the Queensland facility rate was higher than the national rate, with most of these in the Measurement and geometry strand. These items tested a range of understandings such as: visualising, interpreting, comparing and describing a location.

The number of Queensland students answering the items correctly ranged from 98.7% for the first item through 4.4% for Item 35. More than half the items were answered correctly by more than half of students. Numeracy skill demonstrated by more than 80% of Year 3 students included:

- counting arrays in groups of 5
- comparing lengths
- counting money by tens
- interpreting a bar graph.

These items were situated early in the paper, where the less challenging items are placed. The items became more challenging as students progressed through the test. The more challenging items provide students with opportunities to apply their existing knowledge and skills in different contexts. Students with a good knowledge of a range of concepts, and are confident in using these in a variety of contexts are more likely to solve these items. For example, Item 34 involves the calculation of perimeter and determining the number of fence posts required around the garden if they are one metre apart. It required comprehension of the problem, the selection of the applicable operation and visualisation to ascertain the number of posts.

Schools and teachers can use overall performance data to compare against their own data. 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. For example, many teachers would expect most Year 3 students to be able to perform a subtraction operation with two-digit numbers; however, the data shows that when subtraction is presented as a missing addend, as it was for Item 33, many students made an error. They don't link addition to subtraction. They have not internalised the inverse connection between the two operations. This year only 22% of Queensland students answered this correctly. Item 33 also had the added complexity of using cards to demonstrate the expression. Teachers may want to look at their class results and compare how their students performed on this item. Looking back over time, the comparison and missing addend subtraction problems are usually more challenging than the straight take-away problems.

Implications for teaching

Teachers should include problem-solving into their mathematics lessons to assist students to become familiar with solving problems related to the mathematics they are learning at the time rather than dealing with problem-solving as a separate concept. Including problem-solving strategies into mathematics lessons routinely may help students link the language of problems to the mathematical thinking and reasoning required to solve them.

The items with the lowest facility rate (Items 34 and 35) required the students to problem solve. Students found it challenging to identify the processes needed to solve problems. This is particularly evident in multistep problems with a high literacy demand. Students may need practice in both identifying the key words in questions and using a range of effective problem-solving strategies. They also need to be able to check the reasonableness of their answers.

Problem-solving involves using a variety of methods, either learned or well-reasoned, in a logical manner, to find a solution. One of the challenges in teaching problem-solving to young children is to ensure they understand the nature of the problem. Teachers can build students' skills in problem-solving by focussing on interpreting problems and identifying the mathematics required. Students also require opportunities to make their own decisions about how to solve a problem.

To develop students' problem-solving abilities, students need multiple opportunities for practice. To assist students with the problem-solving process:

- teach students the word and language structure clues that provide information about what a question is asking
- discuss different strategies that can be used to solve a problem, e.g.
  - draw a diagram
  - guess and check
  - look for a pattern
  - write an equation
- model the conventions used in mathematics when writing expressions or equations
- give students word problems in different contexts and curriculum areas and at different levels of complexity and ask them to identify the operations needed to solve these without performing the calculations
- provide students with arithmetical expressions and asking them to write word problems to match them
- use class discussions as an integral component of teaching problem-solving to provide opportunities for students to share and critique their strategies and for teachers to hear what students are thinking
- insist on students checking for reasonableness of answers.

Visualisation is an important skill in numeracy; there were a number of items on the paper which required visualisation (Items 2, 5, 11, 12, 24, 28, 33, 34, 35). This skill can help students with geometric understandings, the capacity to interpret diagrams, maps and graphs and to develop problem-solving skills as students create and manipulate images.

Please refer to SunLANDA for a detailed analysis of individual test items, including teaching ideas designed to assist with the development of the understanding and skills required by each item. SunLANDA is available to all schools on the *School Portal* link on the QCAA website. Additionally, SunLANDA materials are available to State schools through *OneSchool*.

Problem-solving strategies

Students need access to a range of problem-solving strategies. Students experiment with strategies, make links to the problem types and rate the strategy efficiency for future use. This process builds flexibility and fluency in knowing which strategy is used when and why a strategy is the best fit for the particular problem type.

Multiple opportunities to experiment with strategies in a problem-solving context will build students' repertoire. The following table lists some common strategies. It is important to remember that strategy-driven problem-solving may narrow students' fluency with creative problem-solving. It is important to acknowledge multiple ways or strategies that can be used to solve the same problem.

Strategy	Examples
make a visual: picture, diagram, graph	• use information provided and make an illustration to better see the mathematics and connections

Strategy	Examples
guess and check / trial and error	• use sense of number and common sense to select the substitution • experiment by substituting carefully chosen, logical numbers
make a list	• list the steps required • make a mind map of ideas around a single starting point making connections to possible strategies, and reasoning
solve a simpler problem (reduction)	• use numbers that are easy to work with and test out reasoning, then refocus or use the numbers from the problem
look for a pattern	• look for pattern • analyse the pattern • use the pattern rule
Identify similar problems	• make connections to problems previously encountered and identify similarities and differences • consider special cases when the strategy may not always be the best fit
eliminate possibilities	• use number sense and common sense to eliminate suggested solutions
work backward	• use the information provided and work from the total to find the missing part
write an equation	• represent variables and symbols in the problem • use balance to maintain equivalence of both sides
identify symmetry	• use symmetry to analyse geometric representations
substitute into a formula	• use understanding of symbols within the formula to identify the numbers for substitution

Teachers can deepen students' proficiency with problem-solving by teaching ways to pose problems. Students will develop insights into:

- the structure of problems
- the problem-solving process
- problem-solving strategies
- problem-solving reasoning.

Through problem posing students develop confidence in mathematical knowledge, procedures and skills. They learn how problems are constructed, the reasoning behind the structure, the strategies for engaging and ways to talk about the problems so they make sense in problem-solving.

Teachers can build a problem-posing culture in the classroom by providing opportunities for students to write problems. For example:

- Students write problems in their spare time and place them anonymously into a *problem box*. At the end of the lesson/day/week empty the box and distribute problems to a group of students

to sort and categorise problems. Allow the students to work out relevant categories. Once the problems are sorted, combine the categories with another group until the class has a set of categorised problems. Groups of students select a category and solve the problems. Each group explains the category, reasoning strategies used for that category, the efficiency of the strategies used and modifications of the posed problems to increase/decrease levels of difficulty/reasoning from single-step to multistep.

- Students use examples from NAPLAN test papers and change an aspect of the problem. Students will need to think and reason as if they were posing problems. Students can use these as opportunities to try different strategies to find solutions.

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