

The Queensland Years 3, 5 and 7 Tests in Aspects of Numeracy

The Queensland Studies Authority (QSA) develops statewide tests to measure the full range of student abilities in numeracy. The tests are developed in accordance with QSA's numeracy test frameworks and are referenced to the current *Years 1 to 10 Mathematics Syllabus*. These test frameworks are available on QSA's website. Some aspects of the *Years 1 to 10 Mathematics Syllabus* (2005) have been based on data gathered from tests held over the past five years.

What is in the test?

Items or questions for the Years 3, 5 and 7 Tests in Aspects of Numeracy are developed around Measurement, Data, Number and Space. Results in each of these areas are reported individually and combined to provide an overall numeracy result.

Test papers include teacher-led and independent activities. Some examples of these activities include:

- mental calculations and calculator activities (teacher-led, approximately 5–10 minutes for each)
- multiple-choice and open-ended items including items requiring the use of manipulative material appropriate to each of the year levels (students working independently, approximately 45 minutes)
- using real-life maps, graphs and tables published in a colour magazine.

Are these benchmark tests?

These tests are not benchmark tests. They contain some questions at benchmark level (minimum competency); however, the majority of test items are above the benchmark level and assess the full range of abilities. This range gives teachers an indication of the various performance levels of the students in their class.

What's a benchmark/benchmark level?

National Numeracy Benchmarks are nationally agreed minimum acceptable standards for numeracy for a particular year level. They enable states and territories to report aggregated student achievement data against these common standards to the Australian community.

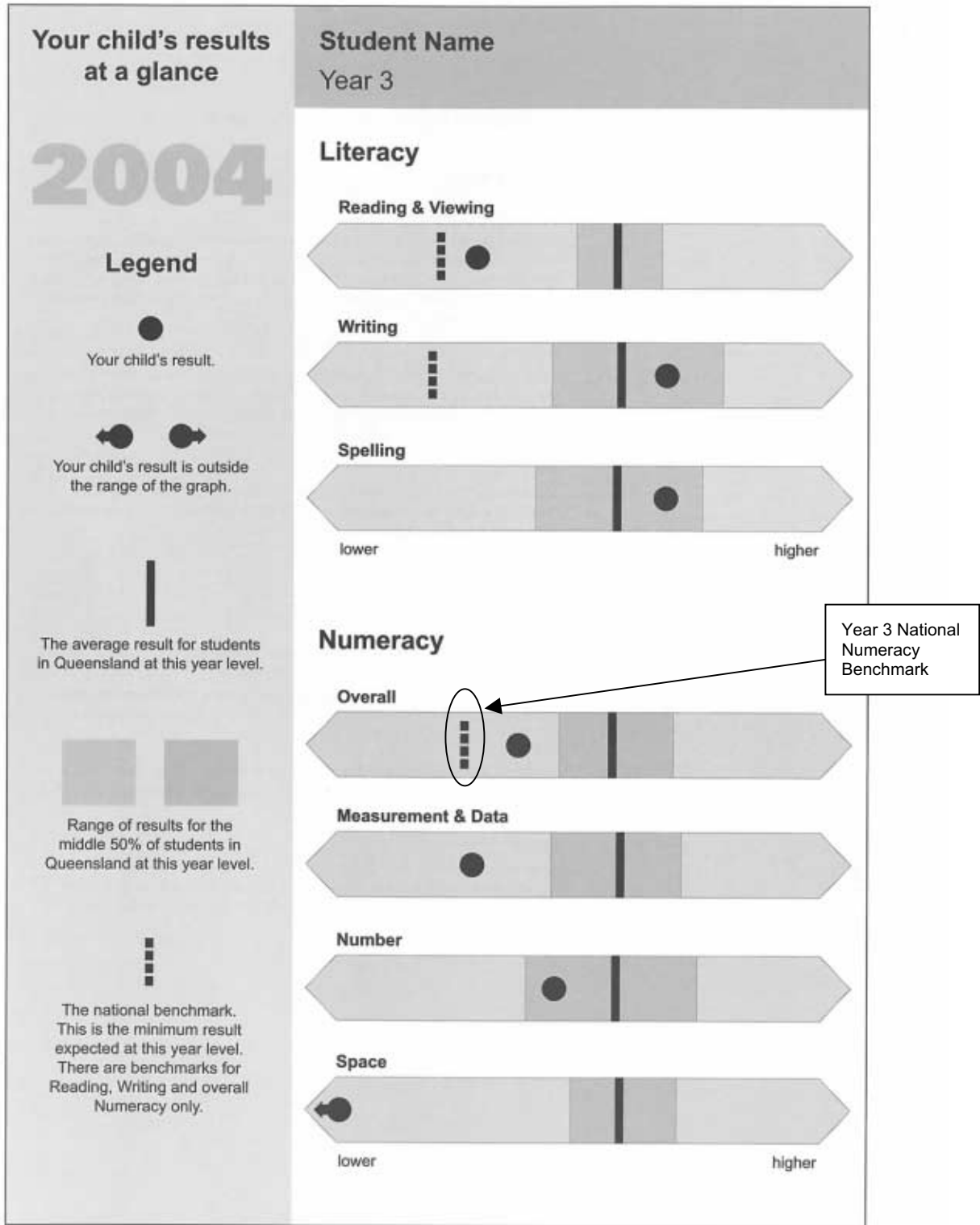
The term **minimum acceptable standard** refers to the level of numeracy a student must have to make progress at school without undue difficulty. Benchmarks represent only the essential elements of numeracy and not the full range of the Mathematics curriculum at a particular year level.

Parents/carers are informed about how their child/children performed in relation to the National Numeracy Benchmarks on the individual student reports, and teachers are given information on class reports. The National Numeracy Benchmark is represented by a dotted line on a scale of performance (see below). For teachers, students performing below the National Numeracy Benchmark are indicated with an asterisk on the class reports. (You can find out more about National Numeracy Benchmarks at www.detya.gov.au/schools/Literacy&Numeracy/benchmarks.htm.)

Student report

Page 3 of the student report provides a visual representation of a student's performance in literacy and numeracy. The graphs show student's scale scores for literacy and numeracy.

Scores at either end of the range for each year level have been truncated. In these cases, the symbols ◀● or ●▶ indicate that the scale score is above or below the range that can be indicated on the graph.



How can teachers use the results from the tests?

Performances of over 160 000 Queensland students are analysed to produce individual student, class and school reports. Assessment of most students across the state at a particular point in time allows comparable student performance information to be generated. When used in conjunction with other forms of school assessment, performance information can assist schools to target programs that improve learning and teaching. Some examples of the types of analyses that teachers and schools can make using the reports are included below.

Class reports

Class reports present a class summary. For each question the class reports provide:

- a summary of each student's response to each question
- the performance of the class as a whole
- the performance of boys
- the performance of girls
- the performance of the cohort (total year level group across the state).

Class reports provide details of how students responded to every question. If an incorrect response was given, that response is recorded for the teacher's reference. This information can be used to identify trends across a class (see example 1) or to identify a small group of students who may have similar errors in their understanding of a concept (see example 2).

Example 1
 Students in this class have made several errors in dealing with money.
 The errors are across a number of different types of questions:
 Q 6 & 9 (Calculator)
 Q 21 (Mental calculation)
 Q 34 & 35 (Written computation).

Example 2
 This question involved mental calculation:
 $60 - 19 = (41)$
 A group of students in this class have responded with 51.
 Possible thinking (relating to of the number fact): The 51 comes from doing the mental computation as a visualisation of the written algorithm but forgetting to regroup – 9 from 10 is 1, 1 from 6 is 5, therefore getting 51.

CLASS REPORT CLASS 2

2004 Queensland Year 5 Tests
Aspects of Numeracy – Number and Numeracy

														Number		Scale Score (1)		
6	7	8	9	18	19	20	21	22	23	24	25	34	35	36	37	Number	Numeracy(2)	
27	23	\$8.20	\$7.10	290	7	41	\$2.45	19	1984	750	\$4.70	20	\$0.60	8	552	599		
*	13	*	9.60	*	*	51	*	7	1986	2.00	*	*	3.70	A	552	599		
47	12	35.1	3.1	*	*	51	2.85	*	*	778	*	*	4.00	*	552	607		
*	*	8.2	3.1	*	*	*	*	*	*	*	*	*	4.70	*	554	674		
25	*	27.6	-	*	*	49	-	-	-	150	*	15	1.20	A	559	574		
*	*	8.02	3.01	*	*	51	*	10	*	250	04.78	*	*	*	523	615		
*	24	*	*	*	*	*	2.50	*	*	*	*	*	*	*	727	594		
4	21	1.06	*	*	6	*	2.25	*	*	170	*	*	1.45	A	502	590		
33	*	*	*	*	*	*	*	*	*	600	*	10	*	*	594	594		
*	*	8.92	39.09	*	*	*	2.10	*	*	*	*	15	2.10	A	523	599		
37	*	19.20	2.10	*	*	*	3.45	*	*	*	4.80	*	2.80	A	602	623		
*	*	34.50	6.90	*	*	36	*	13	*	*	4.60	*	*	A	582	599		
*	22	*	5.90	*	*	*	2.30	21	*	300	*	30	1.70	A	582	590		
*	*	6.02	37.02	*	*	*	2.90	10	1980	250	5.60	*	1.00	*	561	574		
40	*	10.00	10.10	*	*	31	*	12	1903	110	*	*	.90	A	561	590		
*	15	27.10	*	*	*	*	*	*	1986	465	*	25	3.60	A	602	631		
*	*	27.60	*	*	*	*	*	*	*	*	*	*	*	*	778	762		
*	50	3.00	*	*	*	51	2.35	10	1989	540	*	15	6.80	A	539	565		
----- exempt Numeracy -----																		
*	*	*	*	*	*	51	*	14	*	*	4.90	10	3.80	A	623	639		
*	14	41.80	3.40	*	6	51	2.35	6	*	*	3.10	*	1.00	A	539	565		
Continued overleaf ...																		
% correct: Class		76	60	24	28	96	92	56	48	44	64	40	72	60	20	32	Range of Scale Scores in Queensland	
% correct: Boys		69	78	11	11	100	88	67	56	44	78	89	56	67	0	33	316 Lowest	245
% correct: Girls		69	59	31	38	94	94	50	44	44	56	13	81	56	31	31	556 Highest	1107
% correct: Queensland		71	55	34	31	90	83	63	63	53	55	36	75	65	29	36		

Scale scores
 These scores are calculations of the student's overall performance and converted to a number on a common Year 3, 5, 7 scale. The range of scale scores across the state for the year level and strand are provided.

Once the nature of errors made by students has been identified, relevant intervention strategies may be used to support their learning. In example 2, to avoid the error made by students for the algorithm $60 - 19$, students could practise the strategy of rounding up to 20 before subtracting 19 then adding 1. By analysing class reports, schools may design intervention strategies to suit students' needs.

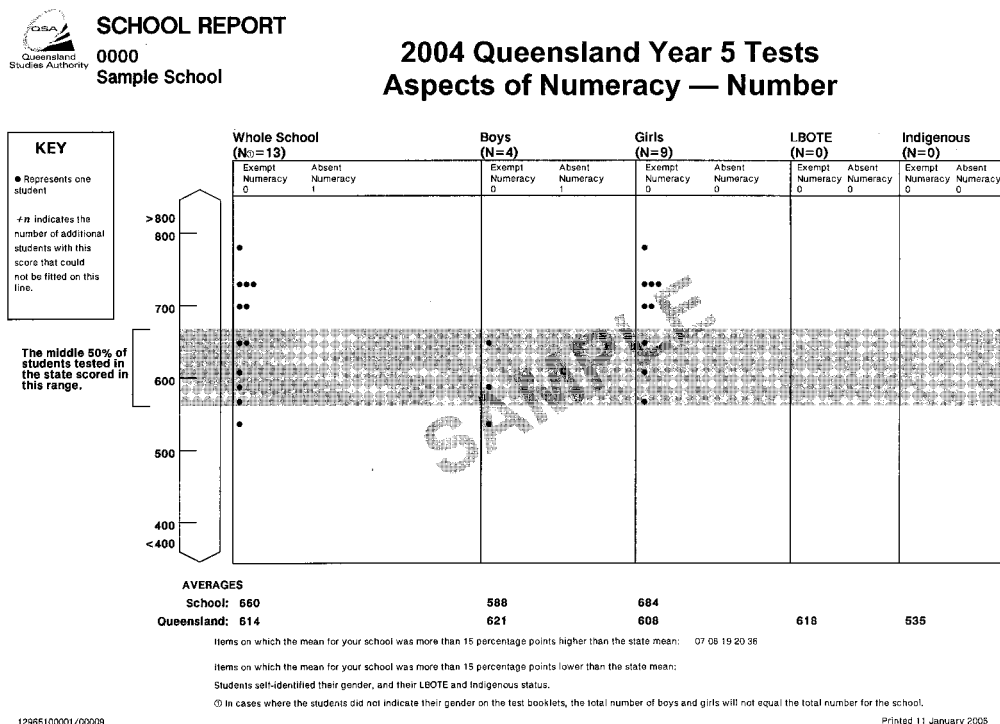
All questions from each year level are scaled for difficulty and expressed in the same units on one common scale. The questions that appear on both the Year 3 and Year 5 papers or on the Year 5 and Year 7 papers allow QSA to place all students on this common scale. These scores are known as scale scores and allow schools to compare performances between students in a particular year level and between students from different year levels. For example, a student in Year 5 who received a scale score of 550 for Number can be compared to a student in Year 7 who received a scale score of 650. Most students normally cluster around an average scale score. Few students score extremely high or low. Scale scores provide a framework for interpreting the raw scores and make them more meaningful.

School reports

The school report contains a school summary and shows trends in student performances on the tests. For each strand it gives performance information for:

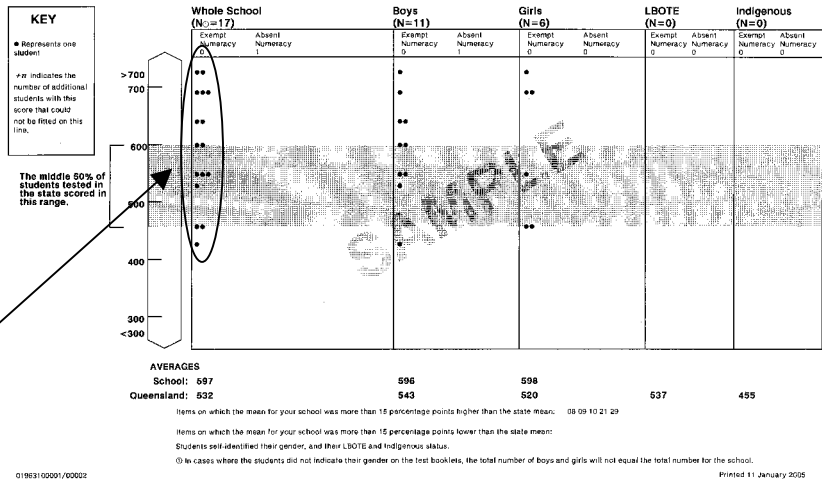
- the whole school
- boys
- girls
- students from a language background other than English
- students from an Indigenous background
- school averages
- a cohort (total group)
- the number of students in the bottom 15 percent.

When analysing school reports, schools should consider the factors that could influence student results. These include diversity of students, attendance rates, expectations of teachers, students and parents/carers, language background, and teaching strategies. A sample school report is provided below.



SCHOOL REPORT
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Sample School

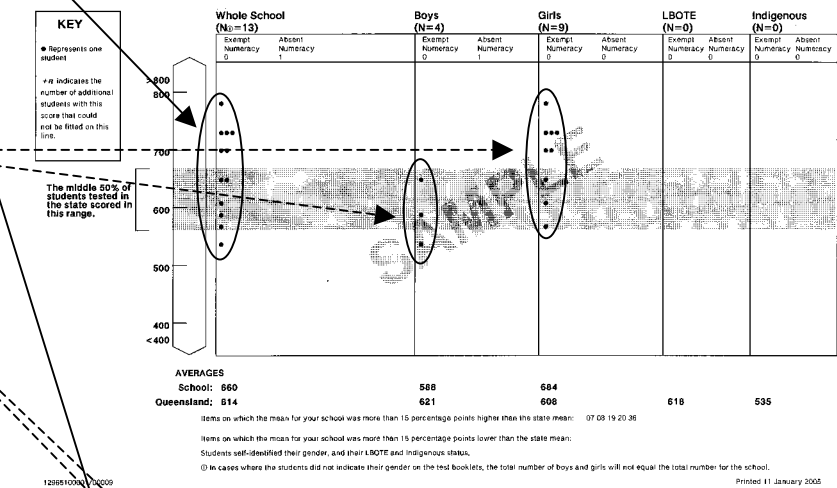
2004 Queensland Year 3 Tests
Aspects of Numeracy — Number



Example 3
At this school most of the Year 3 and 5 students are performing above or at the state average. However, this is not reflected in Year 7 where the results spread further below the average.

SCHOOL REPORT
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Sample School

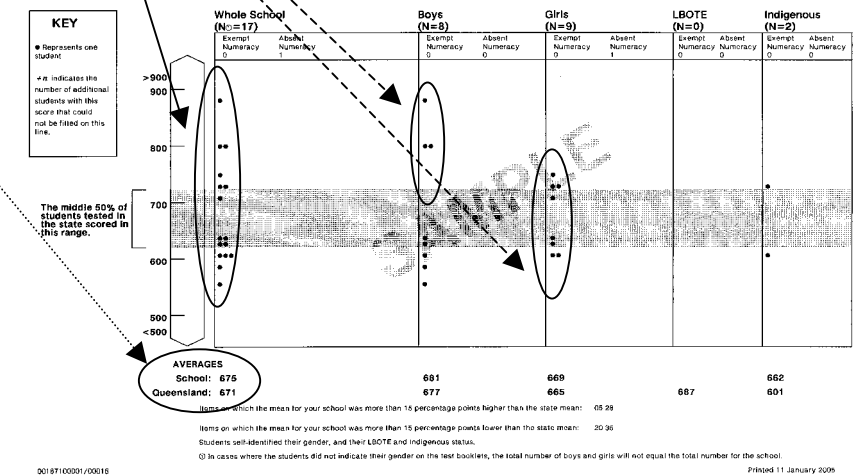
2004 Queensland Year 5 Tests
Aspects of Numeracy — Number



Example 4
Although a small sample, the girls in Year 5 are performing more strongly than the boys; however, in Year 7 the boys are outperforming the girls.

SCHOOL REPORT
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Sample School

2004 Queensland Year 7 Tests
Aspects of Numeracy — Number



Example 5
The state and school averages for each strand are provided. At this school the Year 7 average for Number is 675 compared to the state average of 671 (four scale points above). However, in Year 5 the state average is 46 scale score points above and in Year 3, 65 scale score points above.

Because all three tests are calculated to the same scale, comparisons between year levels can be made. For example, the performances of Year 3 students in Number can be compared with the performances of Year 7 students in Number. This allows schools to monitor growth between the year levels and to look at strengths and weaknesses in school programs (see examples 3, 4 and 5).

The scale scores for the different year levels range from:

- Year 3: approximately 300 (lower) to approximately 700 (higher)
- Year 5: approximately 400 (lower) to approximately 800 (higher)
- Year 7: approximately 500 (lower) to approximately 900 (higher).

Planning future programs

Each year the tests are equated with the tests of previous years. This enables the data to be adjusted to compensate for any variation in difficulty. Consequently, the scale scores from one year can be compared with those from other years. This means that a school can compare the performances of its students each year to measure their improvement in particular strands. For example, if the school was very strong year after year in Number, however not as strong in Space, a review of the teaching and learning of Space concepts could be undertaken, or more resources allocated to that area of mathematics.

The performance of groups of students (boys, girls, Indigenous, language background other than English) can be monitored from year to year. Where a particular strength or weakness is identified, schools could adjust school programs, target specific curriculum areas or provide professional development for staff. The effectiveness of such programs can be monitored over subsequent years. Schools should examine the item descriptions and error patterns, and identify links to the school's teaching and learning programs where:

- current practice is producing encouraging results
- specific teaching and learning are needed
- extra teaching and learning are needed.

Teachers should use the *Years 1 to 10 Mathematics Syllabus* to plan for learning and teaching, maintain areas of strength, and strengthen areas of weakness.