

Example Primary School

South Australia

Data Analysis Report 2018

Prepared by Kennedy Press Pty Ltd

Report prepared on 2018 school data

Data include PAT M results supplied by Example School and NAPLAN analysis

*Please note – Data in this report is
from a real school that wished to
remain anonymous*

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Example Primary School Background Information

The analysis contained within this report is referenced specifically to Example school's context with the understanding that comparisons are relative and need to be nuanced to individual school circumstances. Data are drawn from the 2018 My School website (www.myschool.edu.au)

- Example Primary School has an enrolment of 331 students from Reception to Year 7
- 53% of students are male and 47% are female
- 2% of students identify as Indigenous
- 71% of students have a language background other than English
- Example Primary School is a government school located in an urban setting
- With an Index of Community Socio-Educational Advantage (ICSEA) of 1029, Example Primary School is 29 points above the national average of 1000.
ICSEA provides an indication of the socio-educational background of student; it has nothing to do with the staff, school facilities or teaching programs at the school. (ACARA)
- Attendance rate for all students in Semester One was 92%; the proportion of students attending 90% or more of the time was 76%.

NAPLAN Analysis

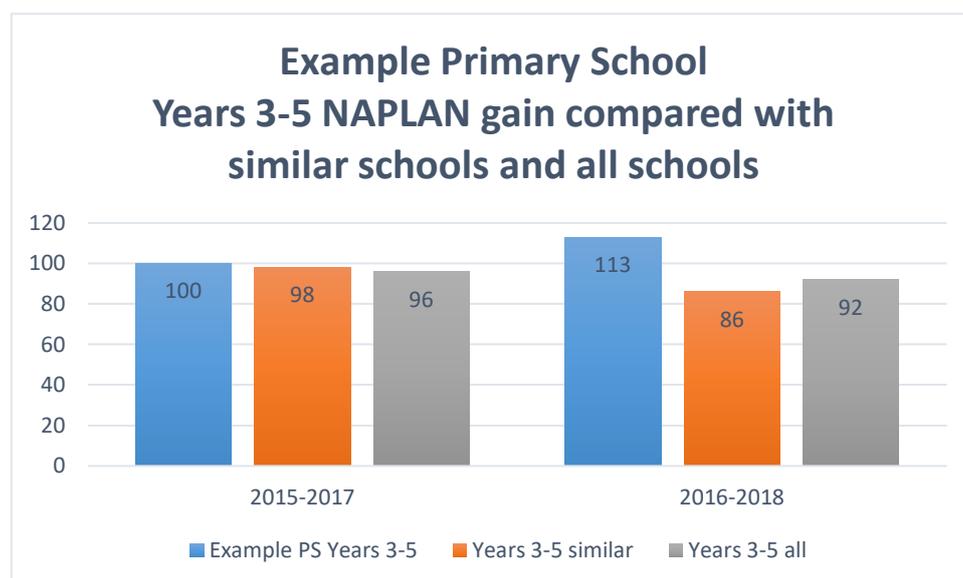
The NAPLAN graphs in this report were prepared using publicly available data from the My School website. When examining NAPLAN growth, this analysis has considered a number of different factors: cohort gain, trends over time, band distribution and proficiency trend data. The analysis uses average student achievement in the numeracy assessment for Years 3, 5 and 7 in Example PS compared with the performance of schools with similar students (as defined by My School) and also with all Australian students.

Cohort Gain

Cohort gain is a measure of the growth made by each cohort of students over the period between two NAPLAN assessments. For example, Year 3 students who sat the test in 2016 will be compared with the Year 5 students who sat the test in 2018. This growth is calculated by subtracting the Year 3 mean scale score from the Year 5 mean scale score, then comparing the gain with similar schools and all schools. A similar process occurs for the growth from Year 5 to Year 7.

Student gain is a way to measure the impact the school has had on student progress. That is, when the background of students is similar across schools, it is more likely that any differences in gain made by schools are related to the teaching and learning capabilities of the school.
(My School)

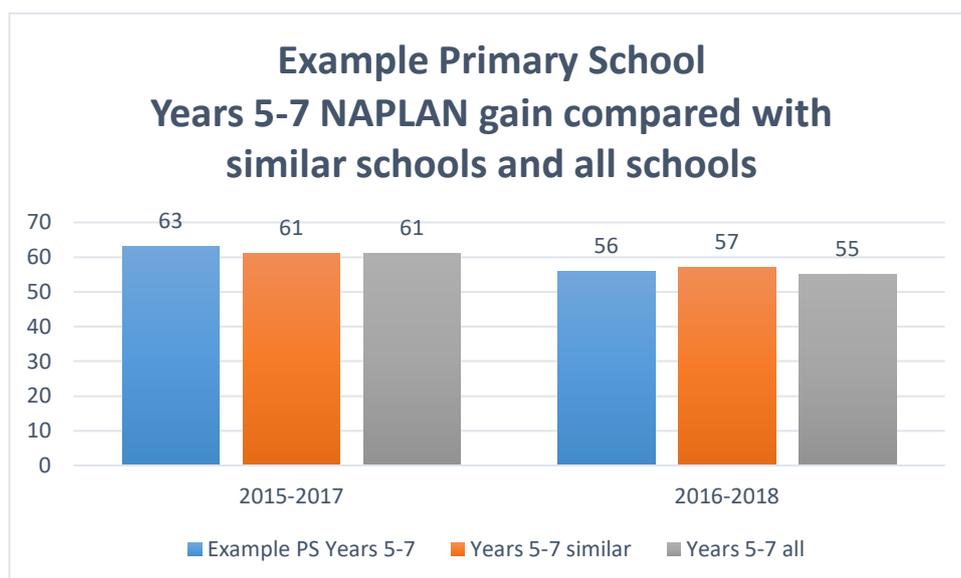
Year 3-5 NAPLAN Cohort Gain 2017 and 2018



The data displayed above indicate that Example Primary School achieved a student gain from Year 3-5 in 2015-2017 of 100 points, compared to 98 points for similar schools and 96 points for all schools. In 2016-2018, Example Primary School achieved a student gain from Year 3-5 of 113 points, compared to 86 points for similar schools and 92 points for all schools.

The graphs show that Example Primary School had a markedly increased rate of gain from 2017-2018, both in raw numbers and especially when compared to similar schools in the second comparison.

Year 7-7 NAPLAN Cohort Gain 2017 and 2018



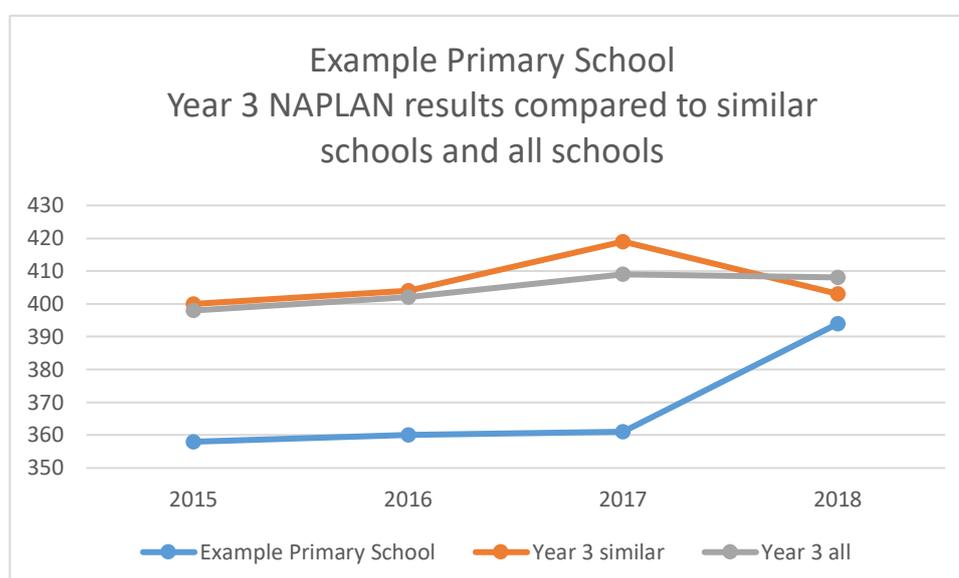
The data displayed above indicate that Example Primary School achieved a student gain from Year 5-7 (2015-2017) of 63 points, compared to 61 points for similar schools and 61 points for all schools. In 2016-2018, Example Primary School achieved a student gain from Year 5-7 of 56 points, compared to 57 points for similar schools and 55 points for all schools.

The graphs show that Example Primary School's rate of gain was comparable to similar schools and all schools. A slight decrease was noted in 2018, however this was not significant.

Trends over time

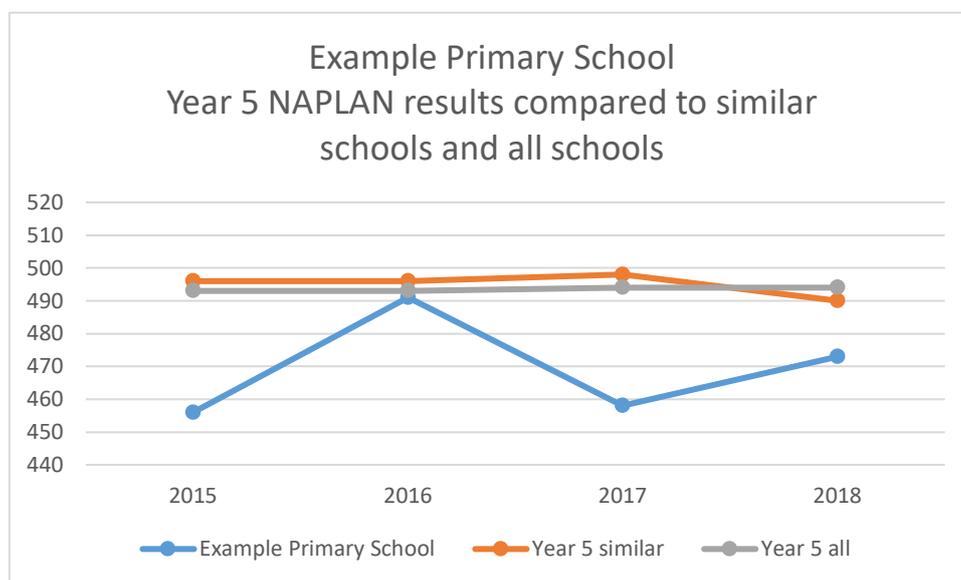
A second factor to consider in an analysis of NAPLAN data is the trends shown in the performance for each year level over time. The line graphs below show four years of mean scale scores for Example Primary School compared with the same data for similar schools and all Australian schools.

Year 3 trend data



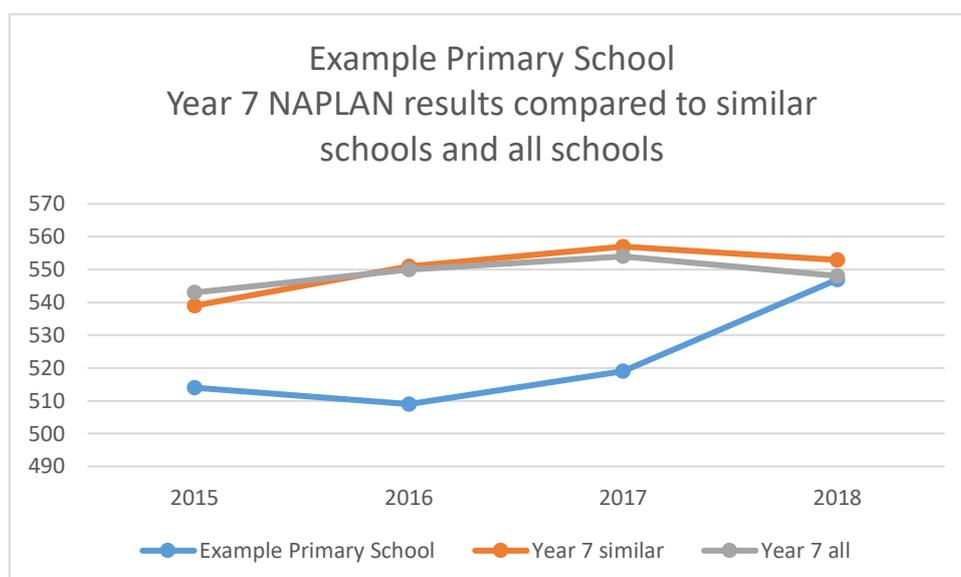
The line graph on the previous page indicates that mean results for Example PS students in Year 3 plateaued from 2015 to 2017 when they were substantially below schools with similar students and all Australian schools. From 2017 to 2018, a dramatic increase occurred resulting in Example Primary School approaching the achievement of similar schools and all schools.

Year 5 trend data



The mean score for similar schools and all schools consistently hovers between 490 and 500 points for the full period. Example Primary School's scores are varied: beginning well below in 2015, achieving close to Australian means in 2016, dropping again in 2017, with a smaller rise in 2018.

Year 7 trend data

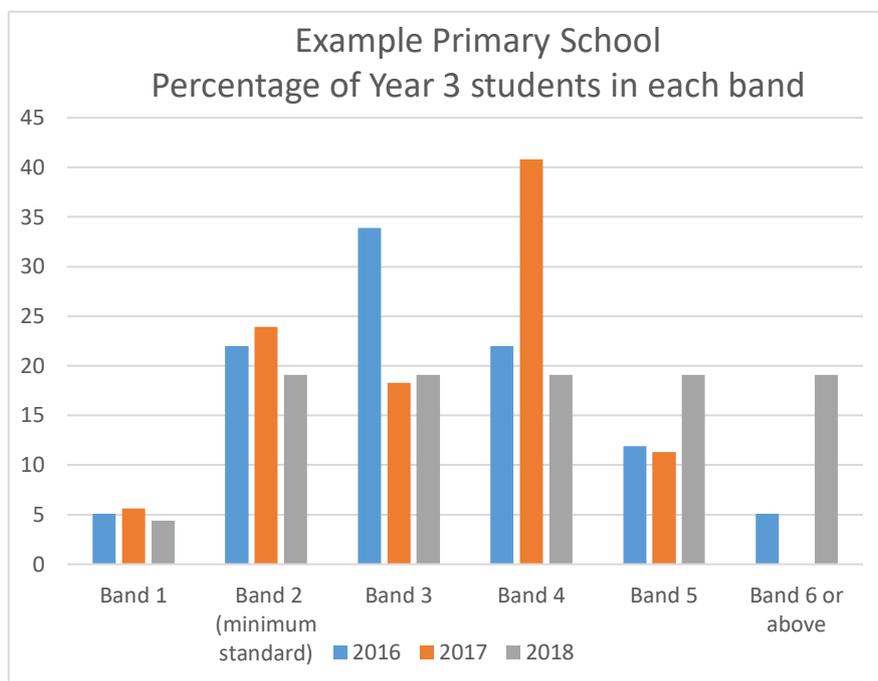


The trend for similar schools and all schools generally shows an increase over the full period with a slight dip in 2018. Example Primary School's performance show a significant improvement from 2016 to 2018 to match Australian means.

Proportion of NAPLAN bands achieved

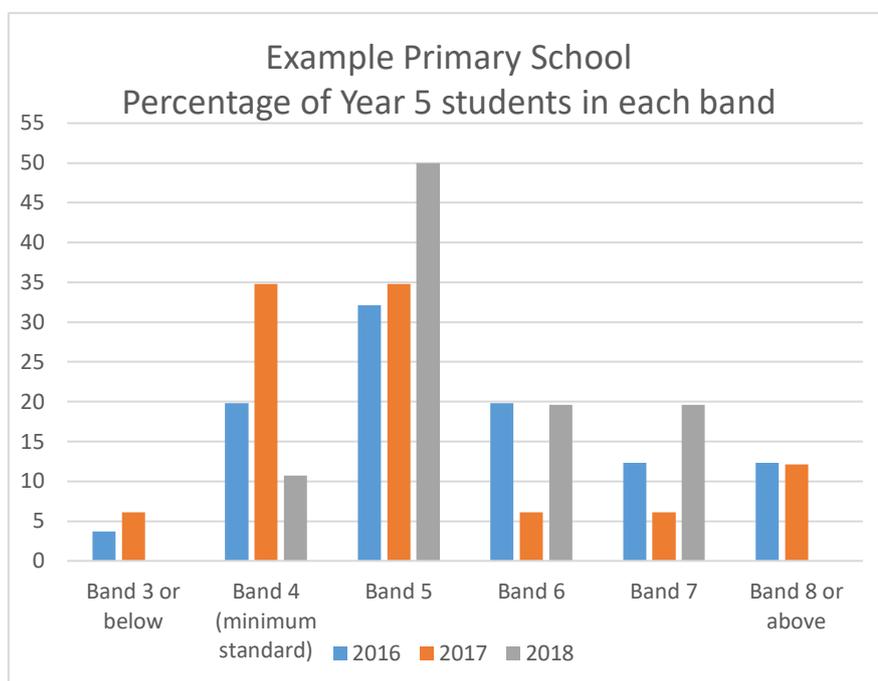
In analysing the proportion of NAPLAN bands achieved, it is not possible to compare with similar schools and all schools due to different percentages of student participation and exemption. It is, however, valuable to calculate Example Primary School's band achievements over several years by converting My School data to percentages relative to the school's participation rate.

Year 3 band data



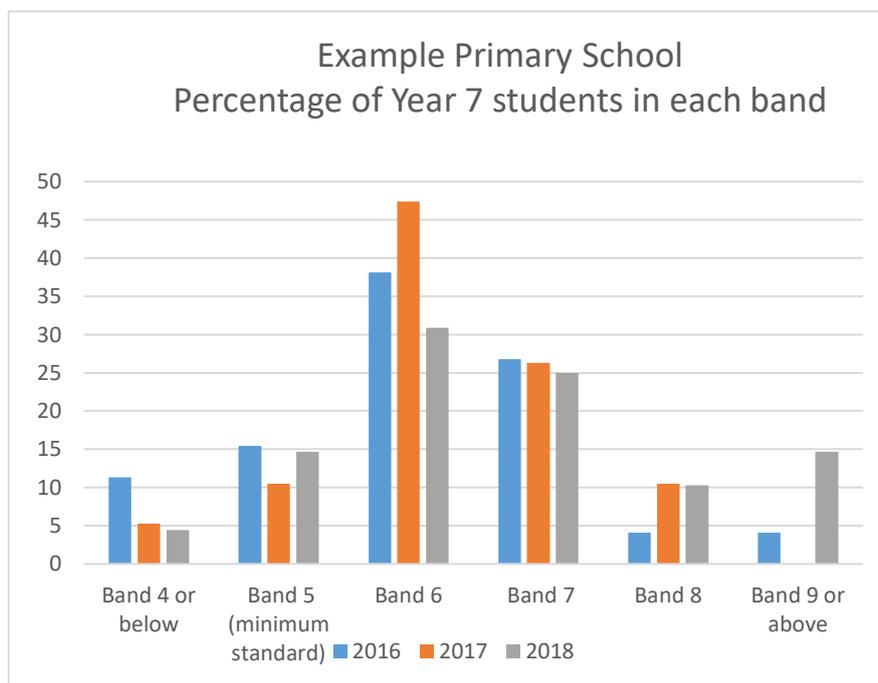
The proportion of Example Primary School students not meeting minimum standard is steady over the period considered. Representation in the upper two bands increased significantly in 2018. There appears to be a positive shift from the middle bands to the upper bands.

Year 5 band data



The proportion of Example Primary School students not meeting minimum standard is similar to Year 3 results for the period considered with the notable exception in 2018 where all students achieved the minimum standard. The difference in distribution in 2018 indicates a compression of results with no students in the lowest band and none in the highest band. There has been a positive shift over time from Bands 4 to 5 and from Band 5 to higher bands.

Year 7 band data



The proportion of Example Primary School students not meeting minimum standard has decreased over the period considered. There has been a positive shift over time from the lower bands to higher bands, notably in 2018 with a superior proportion in Band 9 or above.

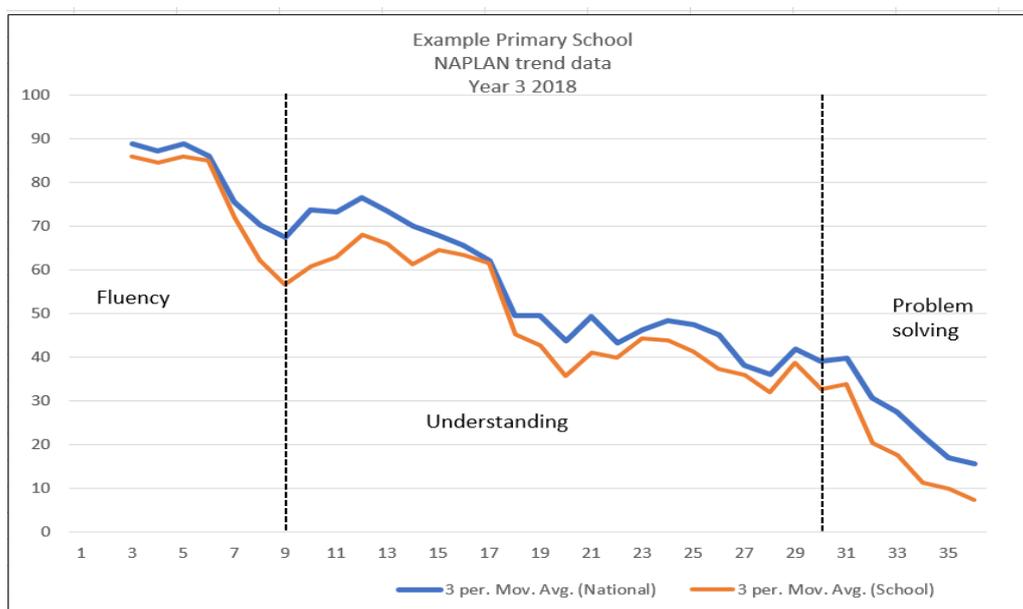
Proficiency Strand Analysis

The following graphs use a moving average to compare the percentage of students in Example Primary School with all Australian schools. The comparison is made using percentage of successful answers for each question.

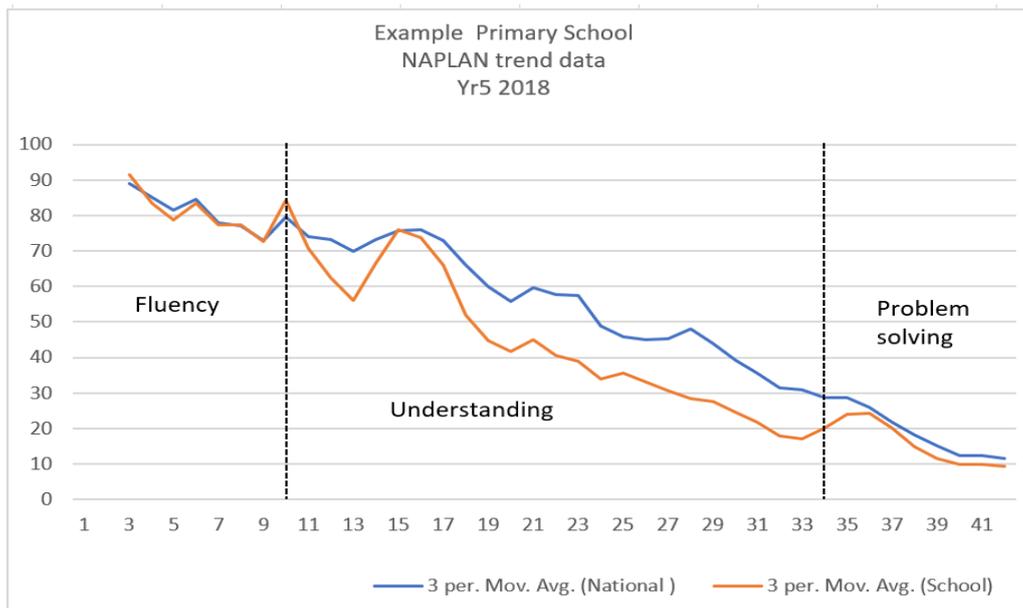
The purpose of this type of graph is to identify differences and similarities which may relate to the Proficiency Strands in the Australian Curriculum.

The following features are characteristic of NAPLAN tests as identified by the authors of this report:

- The first 8–10 questions contain fairly routine, **fluency**-based questions. These show whether or not your students have memorised the mathematics.
- The middle questions (from around question 8–10 to question 27–35, depending on the year level) contain understanding questions that show whether or not your students understand the mathematics, as opposed to memorising it.
- The last 5–8 questions contain **problem-solving** questions. These show whether students are high achieving and/or have developed effective problem-solving capacities.



The general trend of Example Primary School results follows the pattern of the national results, that is, the further into the assessment, there are fewer students who answer successfully. However, there are some notable deviations from the trend. There is a drop in performance with the harder fluency questions which continues into the understanding questions. From then on, the difference is fairly consistent, with Example Primary School achieving results below (of the order of 5 to 8%) the national results.

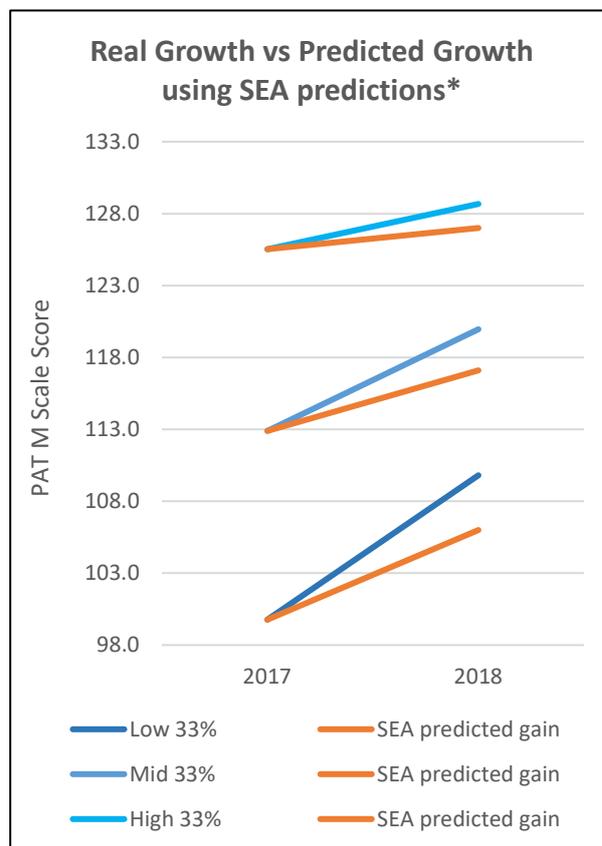


The Year 5 graph shows that Example Primary School students perform at a similar level to the national mean in the early, more fluency-based questions, as well as in the more complex problem-solving questions. There is a clear difference in the understanding section, where Example Primary School students performed well below the national mean.

PAT M Growth Data, 2017-2018 cohort

PAT-M data was analysed for effect size (Cohen's *d*) for each section of the students and was also compared with Dr Chris Brockwell's model for predicting 12 months of gain for all students using the SEA. A summary table and graph are both included below.

n =457 students	PAT mean scale score 2017	PAT mean scale score 2018	Effect size: Cohen's <i>d</i>	Value added above expected gain**
Lowest 33% of students	99.8	109.8	1.2	61%
SEA predicted gain*	99.8	106.0		
Mid 33% of students	112.9	120.0	1.3	68%
SEA predicted gain*	112.9	117.1		
Highest 33% of students	125.5	128.7	0.4	113%
SEA predicted gain*	125.5	127.0		



*Model developed by Dr Chris Brockwell of Elizabeth South Primary School

**Real gain above predicted gain, expressed as a percentage of predicted gain

The graph above compares the cohort's growth with DECD recommendations, using the model for predicting 12 months of gain developed by Dr Chris Brockwell. This enables comparison for the real growth of students with that expected by the department. This shows that each group of students grew between 61% and 113% over and above the 12-month expectation set by the department. While the gain in PAT scale score was the largest for the lowest 33% of students (10 points), the percentage gain above expectations was highest for the highest 33% (113%).

Summary of findings

- *Overall improvement trend*
- *Remains below similar and all schools*
- *Cohort Yr5 2016 and Yr7 in 2018 performed at a significantly higher level than other years*
- *Big jump in performance of Year 3s in 2018*
- *Interesting observation of top bands – Year 3 very high representation in top bands*

Discussion

Junior Primary to Year 3

Overall, despite strong growth data, students in Year 3 are considerably underperforming in the middle and upper bands. Both 2016 and 2017 data show that there were very few students in the upper two bands of NAPLAN. When examining the proficiency strands, it was noted that there was a strong decline in student performance compared to the national average for the problem-solving portion of the test. In our experience, this trend is related to an over-reliance on application-style problem solving (strong use of worded problems) rather than complex, unfamiliar problems (multistep, experimental questions). Another potential issue occurs when teachers think of reasoning mostly as “explaining your steps”.

Middle Primary Growth

While there was strong growth by students from Years 3–5 during 2014–2016; the same data from the 2015–2017 cohort shows a slowing of this growth. Year 5 proficiency trend data shows that students have relatively strong fluency and problem solving, however their understanding is much lower than expected. This trend is also reflected in the band distribution data, with the upper two bands showing a closer representation to similar schools and all schools than the middle bands.

When students struggle with the ‘understanding’ portion of the test, it often indicates that teachers may be asking far more routine-style questions than non-routine questions (that require students to connect, adapt and transfer concepts). They may also be focused on teaching too many different techniques or procedures, rather than focusing on teaching a few procedures that are easily adaptable to a variety of situations.

One other potential source of trouble occurs when teachers focus on teaching each concept separately rather than concentrating on the connections between the concepts. This can be observed by examining where links are made between concepts across a year plan and checking that concepts are developmentally sequenced.

Recommendations

To improve student performance, the following recommendations should be considered for implementation across the school:

1. Review circumstances that may have contributed to advantageous or poor outcomes in NAPLAN and PATM data to determine their possible effects.
2. **Survey staff to determine what they believe problem solving is.**
Watch out for a focus on worded problems: if the difficult part of mathematics is the reading, then the questions are not hard enough. A survey is attached which has several questions that relate to problem solving.
3. **Review the problem solving that teachers are using.**
This should include asking how often teachers are using problem solving (should be at least once per week for 30–90 minutes) as well as what kind of questions are being used.
4. **Audit staff understanding of the proficiency strands.**
An auditing tool regarding all of the proficiency strands is attached for you to use. It is very helpful to examine staff beliefs and practices around understanding and reasoning, as well as problem solving.
5. Junior Primary: **Reduce the number of worded problems** that teachers are using and ensure that all students are exposed to complex (multistep) and unfamiliar (challenging or experimental) problems each week. One simple analogy that might be useful: problem solving can be thought of as experimenting with mathematics that students have not yet been taught how to do, rather than applying mathematics that is familiar to them albeit in a context.
6. **Review the reasoning that teachers are using.**
Results such as those from Example school often indicate that teachers tend to focus heavily on asking students to explain the steps in their process rather than considering the value of deducing, analysing and generalising. Teachers in this situation can be disconcerted when asking a top-performing student how they obtained their answer and the student answers, “I just knew it”. For more help with this topic you may want to consider targeted professional learning on improving student reasoning.
7. Middle Primary: **Check all yearly plans** to ensure that they include a specific focus on developing connections between concepts, particularly the big ideas in number. Develop a suggested teaching sequence that links each concept with the developmental sequence for number and ensure that teachers focus explicitly on teaching the connections. Reduce the number of procedures that are taught, focusing instead on teaching a few highly-adaptable procedures and connecting these procedures with as many concepts as possible.
8. **Audit the assessment** that teachers are using, particularly to determine whether students are attaining A and B grades. Are the questions complex and challenging or are they application questions? A simple flowchart for assessing A-E problem solving is attached to use to examine each question or work sample.

Appendix One

Data tables used to produce band distribution graphs

NAPLAN: proportion of Year 3 students in each band

Band	Band 1	Band 2 (minimum standard)	Band 3	Band 4	Band 5	Band 6 or above
2016	5.1	22.0	33.9	22.0	11.9	5.1
2017	5.6	23.9	18.3	40.8	11.3	0.0
2018	4.4	19.1	19.1	19.1	19.1	19.1

NAPLAN: proportion of Year 5 students in each band

Band	Band 3 or below	Band 4 (minimum standard)	Band 5	Band 6	Band 7	Band 8 or above
2016	3.7	19.8	32.1	19.8	12.3	12.3
2017	6.1	34.8	34.8	6.1	6.1	12.1
2018	0.0	10.7	50.0	19.6	19.6	0.0

NAPLAN: proportion of Year 7 students in each band

Band	Band 4 or below	Band 5 (minimum standard)	Band 6	Band 7	Band 8	Band 9 or above
2016	11	15	38	27	4	4
2017	5	11	47	26	11	0
2018	4	15	31	25	10	15

Appendix Two

Moving average

It is a graphical process that smooths fluctuations to eliminate the “noise” using a series of averages of different subsets of the full data set.