

EDF5017

Assessment Task 2

Part 2-

Numeracy demands on teachers in
schools

Submitted by:

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This essay illustrates an analysis of X Primary School's Year 3 and Year 5 NAPLAN results (see Appendix for data set). School X's students' relative performance over time (2008 to 2017) is interpreted first followed by students' performance relative to similar and all Australian schools. Next, students' performance by band (in 2017) and then Year 5's student gain is discussed. In the end, implications for the school's administration and teachers based on the statistical analysis is considered.

Relative performance over time

Year 3 students' performance over the years has been mostly **consistent** as the error bars in majority of the years (except 2008 and 2011) lie in Band 3 and 4. It is observed that 2013 has the lowest score because the lower end of the error bar lies in Band 2. A confidence interval of 90 percent throughout the length of the error bar makes it possible to infer that the true average of school X's students' performance could lie in Band 2.

Student performance significantly improved in 2011 from 2010 – Band 3 to Band 5. Also, the 2010 error bar lies way below the 2011 error bar and both do not overlap at any score point on the graph, which gives us strong evidence that there is a definite difference between the two.

Additionally, students performed similarly in years 2008 and 2011. There is strong evidence for this claim as the top end of the 2008 error bar ends at the mean value point of the 2011 error bar (approximately 439). At the same time, lower end of the 2011 error bar ends at the mean value point of the 2008 error bar (approximately 413). Therefore, even though the performance jumped from 2010, it was not as substantial as compared to 2008.

A common trend noticed in both year levels is the excellent performance in 2011 as the diamonds lie in Band 5 for Year 3 students and Band 7 for Year 5 students (highest ever). These almost reach the end range of above national minimum standards – Band 6 and Band 8 respectively.

Year 5 students' performance was steadily rising from 2008 to 2011 but has dropped two bands to Band 5 in 2012. There has been no significant change since 2012 except for 2017 when school's average rose up to Band 6. Additionally, even though student performance data looks healthier for Year 5, Year 3 data is more reliable or accurate as the length of error bars are shorter, that is, lower standard deviation. Hence, there is more uncertainty in the average mean scores for **Year 5**. Even with a confidence interval of 90 percent, they are **not as reliable as year 3's data**.

Relative to those at similar schools and to those at all Australian schools over time

Schools with similar students:

School X's Year 3 and Year 5 students' achievement during the years from 2008 to 2017 is at or above similar school averages because the error bars lie on or above the blue line averages except for Year 3 in 2013 and 2017. Confidence interval of 90% makes it possible for us to assume that the true mean of School X's students' performance meets the line graphs in all the years. Year 5's possibility of meeting or being above the true mean seems a lot more than Year 3 because the lower ends are overlapping the line graph, whereas, for Year 3, the top ends are overlapping the line graphs.

With respect to Year 3 students' performance in 2013 and 2017, because we do not

know the confidence interval for similar schools, it is hard to conclude that the school did in fact perform below average. The confidence interval could reach up to anywhere above 374 and/or the accurate mean could lie beyond the score these error bars stretch up to.

All Australian schools:

Year 3's performance compared to all Australian schools is below average in most years as the error bars do not meet the black line graph except for 2008 and 2011. Most recently, in 2017, it was substantially below average.

In 2011, Year 3 and Year 5 students have performed well above all Australian school averages as the error bars do not overlap both line graphs. Also, there is wide gap (difference of approximately one whole band for Year 5) between the ends of the 2011 error bars and the line graphs. Hence, while it is possible that the true means of the line graphs might lie or overlap school X's mean, the wide gap makes it more likely that it is not the case – Year 5 students did in fact perform significantly better than all Australian schools in 2011. There is a lower possibility of the same for Year 3 because the gap is narrower and the confidence interval could overlap the 2011 error bar.

Achievements by band

Most of Year 3 students from School X (55%) achieved a score of Band 3 and 4, which is above the national minimum standard of Band 2. Similarly, most (56%) of Year 5 students have achieved Band 5, which is above national minimum standard of Band 4.

Irrespective of the above, similar and all Australian schools' frequency polygons for

Year 3 created from the graphs on page four would peak towards the higher band scores. This means that students from these schools have a higher distribution or concentration in **higher band scores**, which suggests that most (55% and 67% respectively) of the students have scored above the national minimum standard (Band 4, 5 and 6 or above). Conversely, most of the students from School X have scored in **lower band scores** of one, two and three. 11% of students are below the national minimum standard (Band 1).

The case is similar for Year 5 students as bar graphs on page five for similar and all Australian schools suggest scores are even more **equally distributed**. However, there are no students performing below the national minimum standard (Band 3).

Student gain

Firstly, massive difference in the degree of variability between School X and similar schools does not allow us to make a fair comparison. Nonetheless, inclusion of mean or median scores with 90 percent level of confidence provides us with relatively reliable interpretations. Thus, student gain in comparison with similar schools is **on par** because the School X error bar overlaps similar schools as well as all Australian schools in Year 5. In fact, these other schools have a lower percentage growth as compared to School X based on these approximations – School X's students' performance average increased from 350 to 478 (36.57% increase), similar schools from 374 to 478 (27.80% increase) and all Australian schools from 400 to 500 (25% increase).

Implications

Year 3 might seem like a matter of concern but the discussions above suggest students' performance almost meet similar and all Australian schools' averages. The red or dark red diamonds are not exactly indicative of low performance levels because Year 3 students' performance by itself is good. Consistency of scores in the last three to four years also suggest their performance is not deeply concerning.

Nevertheless, student band achievement in 2017 for both year levels indicates majority of students' scores lie in the lower bands in comparison with similar and all Australian schools. This could be a matter of concern for the staff to investigate possible reasons for the same. Strategies specific to students' backgrounds should be considered as 81% of student population come from a language background other than English. Perso (2011) argues it is more likely these students struggle to read and interpret many questions on the NAPLAN numeracy tests and are unable to determine what they are required to do, thus are disadvantaged. Also, if similar schools can achieve such distributions, then there is potential for development.

As all Australian schools' maximum ICSEA value is 1200 in comparison with School X's ICSEA value of 961, there is a huge possibility that students' parents' backgrounds positively affect students' scores (Masters, Rowley, Ainley, Khoo, 2008). Hence, replicative measures need to be implemented at School X.

Year 5 students' performance in 2017 meets national averages, but the low level of reliability on the data provided should keep teachers vigilant. Current strategies need to be improved or enhanced in order to be well above average. In relation, student gain in comparison with other schools is impressive overall. However, the statistical artefact of 'regression towards the mean' could have brought the scores closer to the

average in the second test (ACARA, 2015). Hence, significant increase in their scores is not entirely a matter of effort and Year 5 students' performance should be of some concern.

Lastly, the sudden rise in 2011 could be because the paper set was not as difficult as other years but NAPLAN's equating processes should not allow that to occur. More data related to student gain from that Year level to the next Year level will allow us to investigate whether that particular batch of students was exceptional or any other reasons. Otherwise, School X needs to review teaching strategies from that year.

References:

Australian Curriculum Assessment and Reporting Authority (2015). *Guide to understanding student gain*. Retrieved from

http://docs.acara.edu.au/resources/Guide_to_understanding_gain.pdf

Masters, G., Rowley, G., Ainley, J., Khoo, S. T. (2008). *Reporting and comparing school performances*. Retrieved from

http://www.aph.gov.au/binaries/senate/committee/eet_ctte/naplan/report/c03.pdf

Perso, T. (2011). Assessing numeracy and NAPLAN. *Australian Mathematics Teacher*, 67(4), 32-35. Retrieved from

http://go.galegroup.com.ezproxy.lib.monash.edu.au/ps/retrieve.do?tabID=T002&resultListType=RESULT_LIST&searchResultsType=SingleTab&searchType=AdvancedSearchForm¤tPosition=4&docId=GALE%7CA273786735&docType=Article&sort=Relevance&contentSegment=&prodId=AONE&contentSet=GALE%7CA273786735&searchId=R1&userGroupName=m

onash&inPS=true&authCount=1

EDF5017 – Assessment Task 2, Part 2 – NAPLAN Numeracy Dataset

Background Information about School X

2017

School facts

School sector	Government
School type	Primary
Year range	Prep-6
Location	Major Cities

School staff

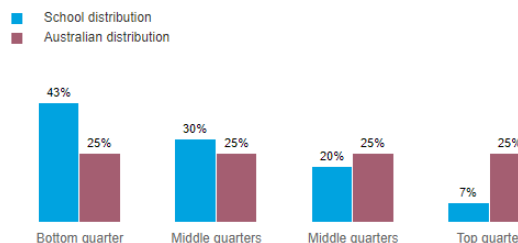
Teaching staff	21
Full-time equivalent teaching staff	18.8
Non-teaching staff	8
Full-time equivalent non-teaching staff	4.9

Student background

Index of Community Socio-Educational Advantage (ICSEA)

School ICSEA value	961
Average ICSEA value	1000
Data source	Parent information

Distribution of students

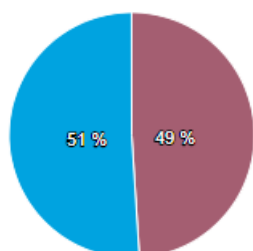


Percentages are rounded and may not add to 100

Students

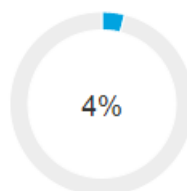
Total enrolments: 232

- Boys 118
- Girls 114

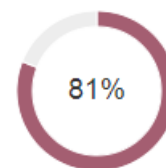


Full-time equivalent enrolments: 232.0

Indigenous students



Language background other than English



If you need more information about the terms used in this dataset, please go to the More Information and Glossary sections of the My School website (www.myschool.edu.au).

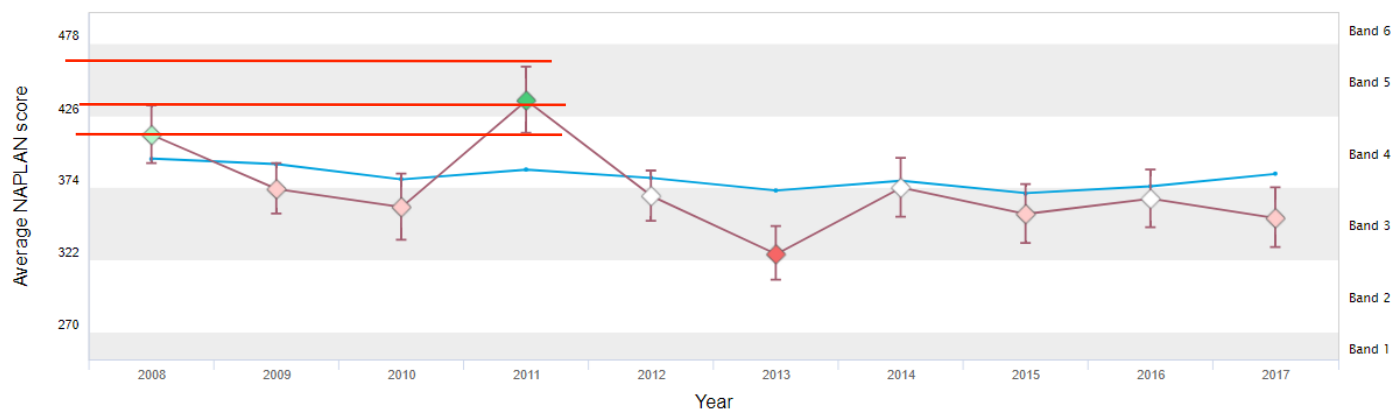
My School®

acara AUSTRALIAN CURRICULUM, ASSESSMENT AND REPORTING AUTHORITY

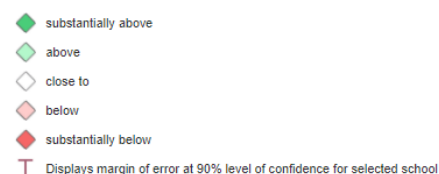
Find a school	About	More information	Glossary	Contact ACARA	Q
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NAPLAN Year 3 Numeracy: School X and Schools with Similar Students

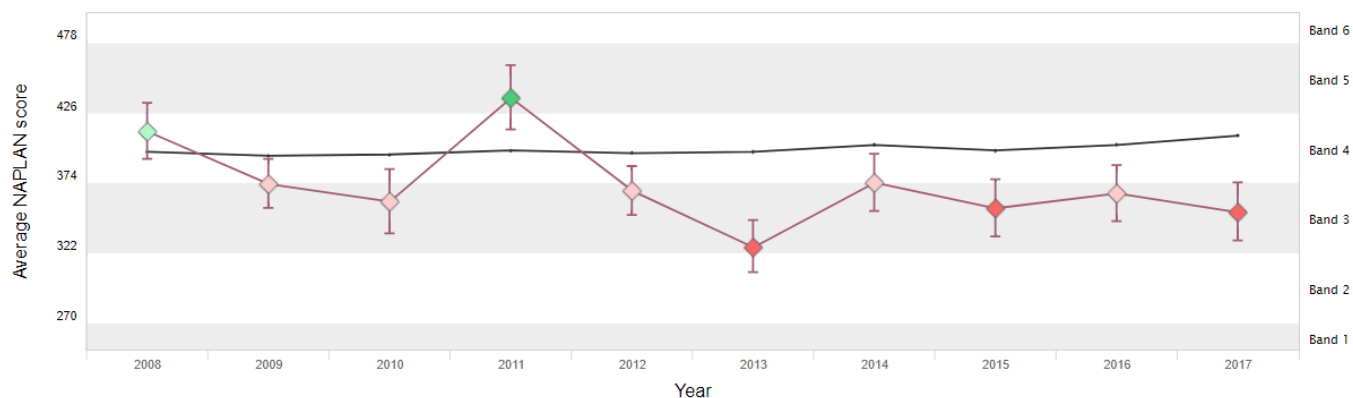


Selected school's average when compared to schools with similar students

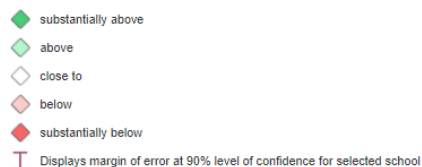


For more information about interpreting these graphs, please go to https://www.myschool.edu.au/media/1632/results-graphs_ss.jpg

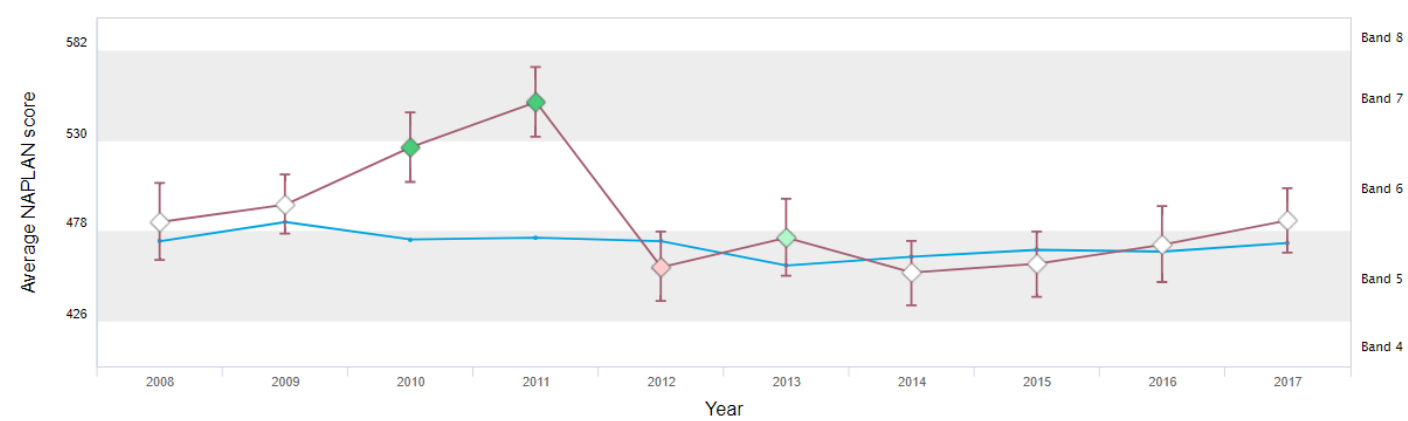
NAPLAN Year 3 Numeracy: School X and All Australian Schools



Selected school's average when compared to schools with similar students



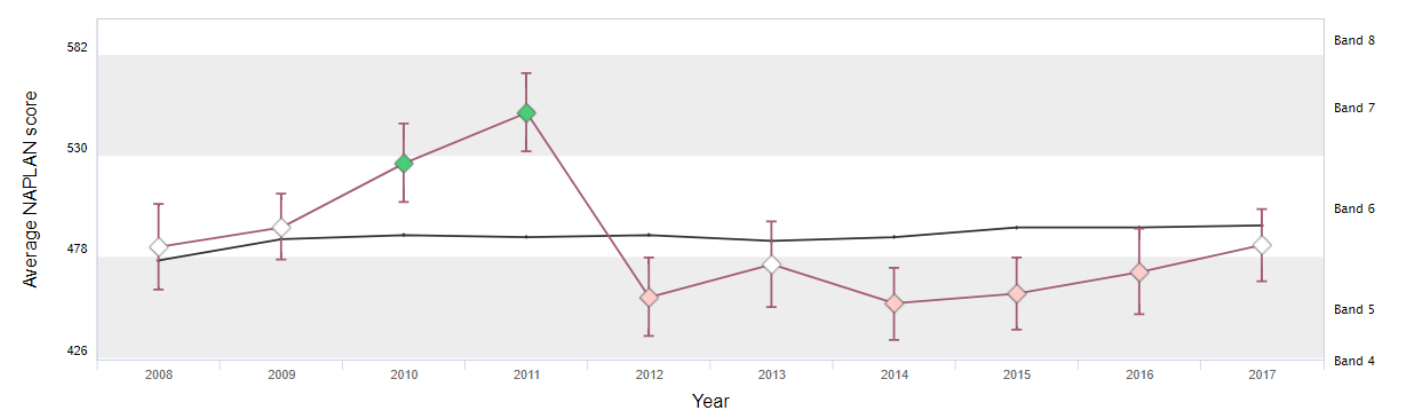
NAPLAN Year 5 Numeracy: School X and Schools with Similar Students



Selected school's average when compared to schools with similar students

- substantially above
- above
- close to
- below
- substantially below
- Displays margin of error at 90% level of confidence for selected school

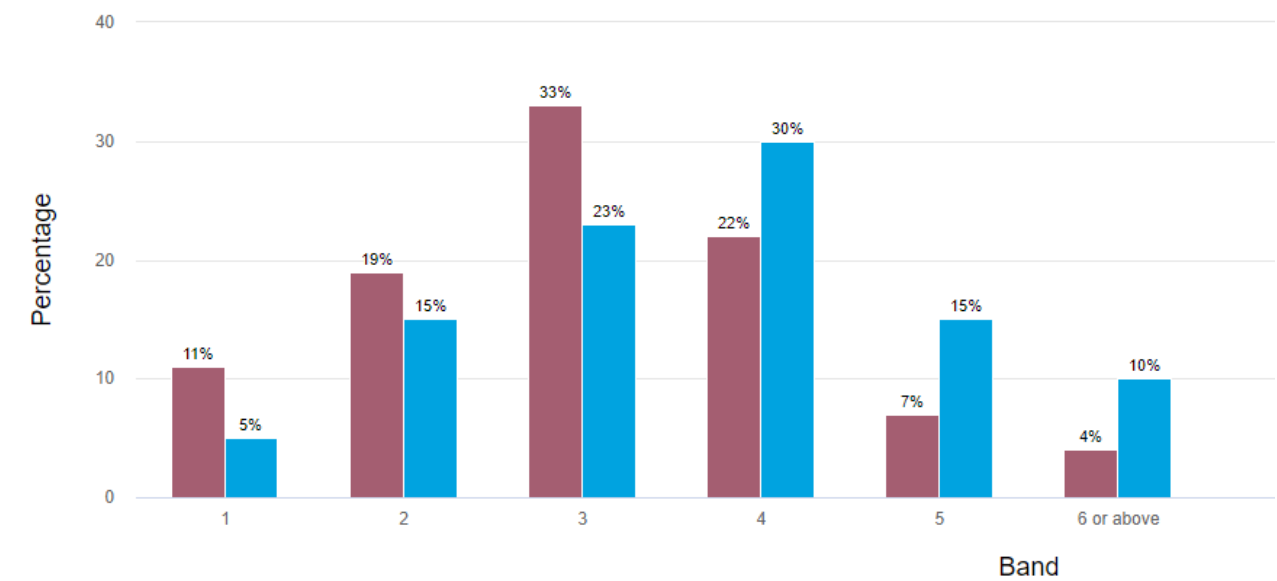
NAPLAN Year 5 Numeracy: School X and All Australian Schools



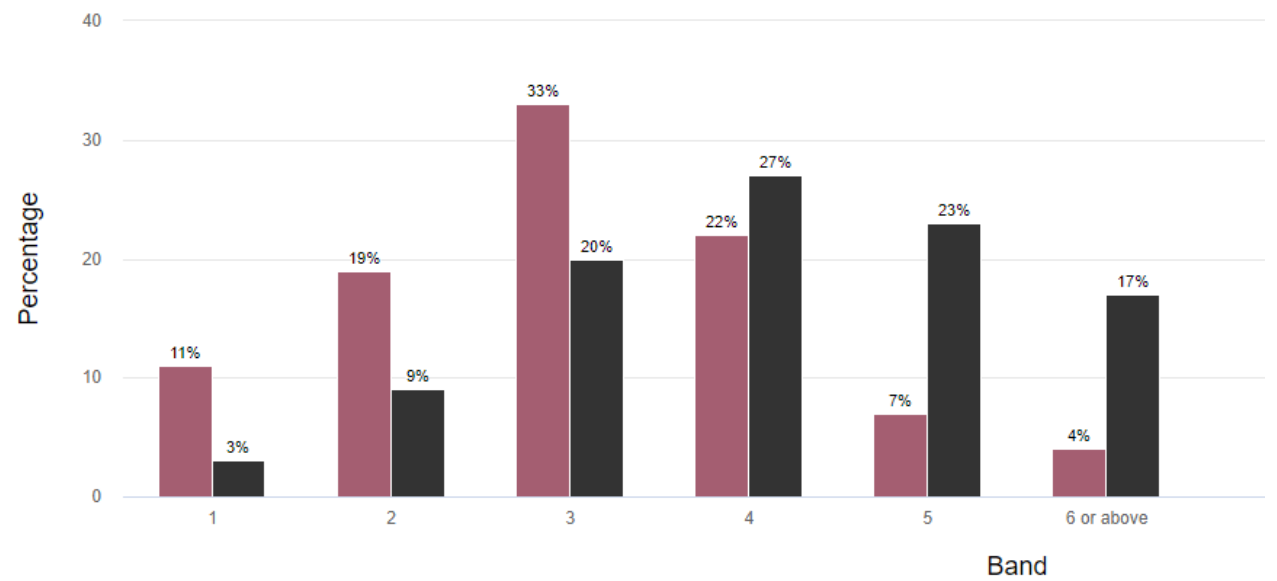
Selected school's average when compared to all Australian schools

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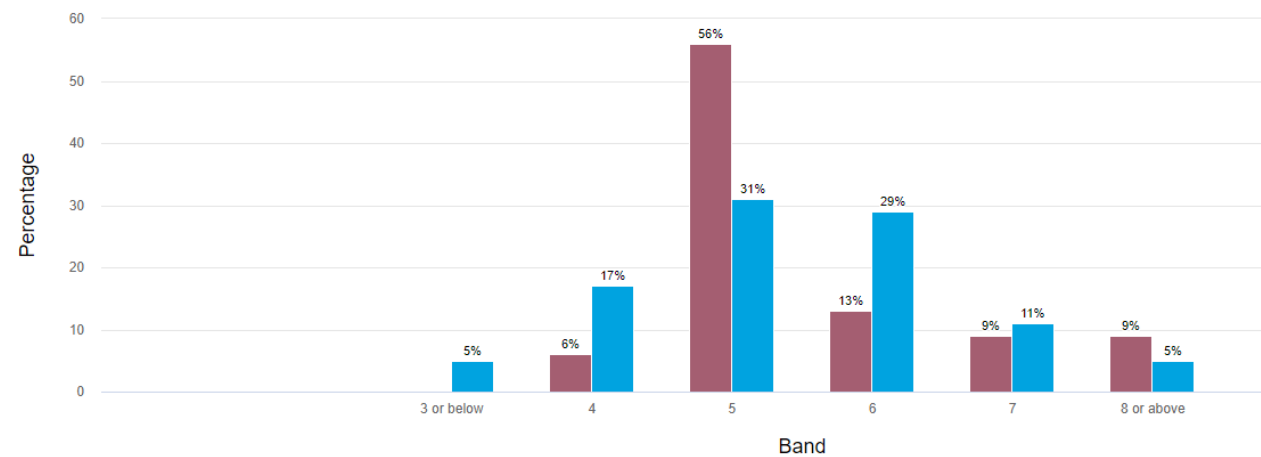
Results in Bands – NAPLAN Year 3 Numeracy: School X and Schools with Similar Students



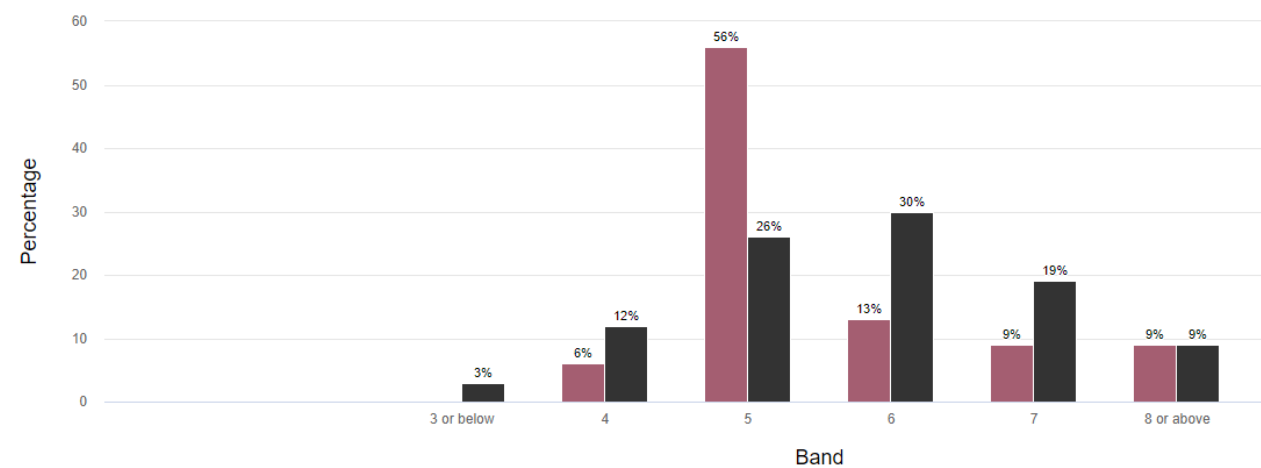
Results in Bands – NAPLAN Year 3 Numeracy: School X and All Australian Schools



Results in Bands – NAPLAN Year 5 Numeracy: School X and Schools with Similar Students



Results in Bands – NAPLAN Year 5 Numeracy: School X and All Australian Schools



Gain scores for students who were in Year 3 in 2015 and Year 5 in 2017

Year 3-5

Numeracy

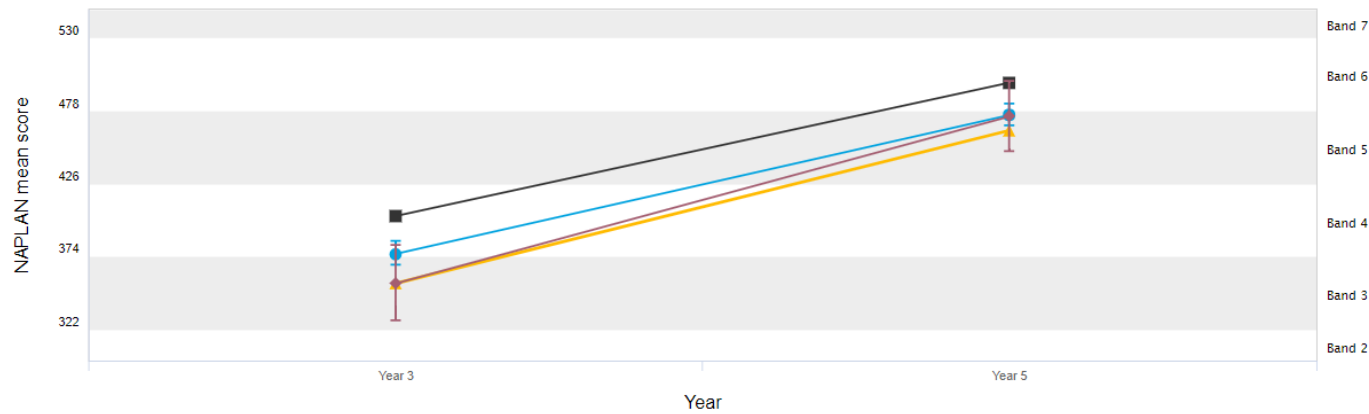
2015-2017

Average

Submit

Select categories: ☒ Selected school ☒ Schools with similar students ☒ Students with the same starting scores ☒ All Australian schools [Interpreting this graph](#)

Percentage of students in this year level for whom previous NAPLAN results (2 years prior) are available: 63%



- Average or Median achievement of students in the selected school
- Margin of error at 90% level of confidence
- Average or Median achievement of students in schools with similar students and margin of error at 90% level of confidence
- Average or Median achievement of students with the same starting score
- Average or Median achievement of students in all Australian schools

For more information about interpreting this graph, please go to <https://www.myschool.edu.au/media/1450/student-gain.jpg>