



## National Assessment Program Science Literacy Year 6 Report 2015

### Background

The fifth cycle of the Education Council's National Assessment Program in Science Literacy (NAP-SL) was conducted in October 2015. Previous NAP-SL assessments have been held in 2003, 2006, 2009 and 2012.

The 2015 cycle was delivered online for the first time. An additional analysis of data was undertaken to address a mode effect relating to moving the NAP-SL assessment online, creating a delay to the reporting timeline.

A sample of 1878 Year 6 students from 88 Western Australian schools (12410 students Australia-wide) representing all sectors were assessed to determine their levels of skills, knowledge and understandings in primary science.

Students completed online one of seven 40-item objective tests, one of two inquiry tasks and responded to a 43-item survey regarding their perceptions of, and attitudes to, science and their experiences of science learning at their school.

### National Assessment Program Science Literacy Year 6 Report 2015

- The results over the five NAP-SL assessments show little change in national performance levels, in terms of both average student achievement and the proportion of students performing at or above the defined proficient standard in science literacy.
- Western Australia was the *only* jurisdiction to show a statistically significant improvement since 2006 in mean student achievement and in the proportion of students performing at or above the proficient standard.
- The 2015 national results do not differ significantly from those of previous cycles, both in terms of mean student achievement and the distribution of student scores.
- The proficient standard is set at a challenging level and only just over half (55.1 per cent) of Year 6 students reach or exceed it (55% in WA).
- Similarly, the comparison between 2006 and 2015 results shows that there is no statistically significant difference at the national level.
- 2015 results show Western Australia has maintained cumulative gains between 2006 and 2012, achieving a significant increase of 27 points in 2015 compared with the mean student achievement in 2006.
- For Western Australia in 2015 the proportion of students performing at or above the proficient standard increased significantly (by 11.1%) compared to 2006 levels.
- In Western Australia, students' performance in science literacy improved consistently from 2006 to 2012, lifting its ranking from 7<sup>th</sup> in 2006 to 4<sup>th</sup> in 2009 and 2<sup>nd</sup> in 2012 in terms of means. It dropped to 4<sup>th</sup> in 2015. Over the same period the rankings, in terms of meeting or exceeding the proficient standard, changed from 7<sup>th</sup> to 3<sup>rd</sup>, to 2<sup>nd</sup>, to 3<sup>rd</sup>.
- For male and female students, there was a significant difference in mean achievement. Female students performed better than male students nationally. Western Australia had the largest difference between gender groups, with the mean score for female students a significant 28 points higher than that for male students.
- Indigenous students had a statistically significant lower mean achievement than non-Indigenous students. These results are consistent with all previous cycles.
- Students from metropolitan areas have higher mean scores than students in provincial areas who, in turn, have higher mean scores than students in remote and very remote areas. This is consistent with previous cycles.

- As in 2012, there was no statistically significant difference in the achievement of students from English-speaking backgrounds and students from language backgrounds other than English.

### **Key student survey findings**

- Survey items related to students' self-concept in science (that is, the level of belief that students have in their own science competencies) had significant correlations with test performance in all states and territories.
- Over 85 per cent of students responded that they would like to learn more science at school, indicating that a positive attitude towards this subject area exists.
- The percentage of students who agreed or strongly agreed with the statement "I think it would be interesting to be a scientist" was 69 per cent which was a significant increase from 2012.
- Most students reported that they do not have visitors come to speak to them about science topics (69 per cent) and that they do not go on science related excursions (63 per cent). However, students reported that they believe their teacher enjoys teaching science (85 per cent).

A more comprehensive summary of the report can be found in Appendix 1.

A media statement from ACARA can be found in Appendix 2.

## Appendix 1: NAP–SL 2015 Report

### Background

The fifth cycle of the Education Council’s National Assessment Program in Science Literacy (NAP-SL) was conducted in October 2015. Previous NAP-SL assessments have been held in 2003, 2006, 2009 and 2012.

NAP-SL is one of a suite of three national sample assessments (with Civics and Citizenship and ICT Literacy) which are conducted on three-year cycles with samples of students from Years 6 and 10. For Science, the PISA assessment of 15 year-olds in science literacy replaces the Year 10 component. PISA 2015 results were reported in December 2016.

A representative sample of Year 6 students was assessed to determine their levels of skills, knowledge and understandings in primary science. Nationally, 12410 students from 599 schools representing all sectors in all states and territories participated, including 1878 students from 88 Western Australian schools.

The 2015 cycle marked the first online delivery of NAP–SL.

The student test player was configured to present the following components to students:

- one set of practice items designed to help students use the online system
- one test consisting of a variety of item types that tested students’ science literacy skills in a broad range of contexts
- one inquiry task consisting of a variety of item types that tested students’ science literacy skills within the context of a single inquiry activity
- one student survey of students’ regarding their perceptions of, and attitudes to, science and their experiences of science learning at their school.

Students were allowed 60 minutes for the test and 35 minutes for the inquiry task. While the survey was an untimed component of the assessment, approximately 20 minutes was recommended.

### Results: state and territory comparisons

Summary tables from the report showing Western Australia’s results in comparison to those of other states and territories can be found below. Results are considered in terms of mean scores and the distribution of students across five proficiency levels.

#### Mean score

Across Australia there were no statistically significant changes in mean scores between 2012 and 2015. Western Australia, with an increase of 27 points, was the only jurisdictions to show a statistically significant improvement in mean score between 2006 and 2015.

In terms of ranking by mean score, Western Australia has moved from seventh position in 2006, higher only than the Northern Territory, to fourth in 2009, second in 2012 and fourth in 2015. Though Western Australia’s mean increased by two points in, the increases by Tasmania and NSW were larger. However, with the exception of the Northern Territory the differences in mean performance by all other jurisdictions were not significant.

## State and territory rankings by mean score

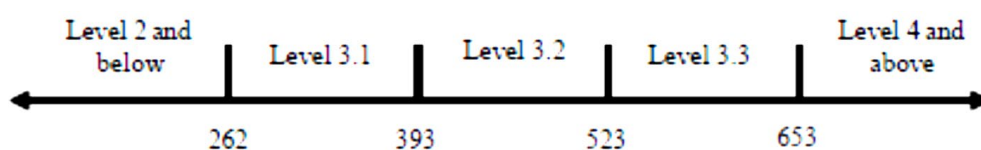
Table 4.5 State and territory mean score rankings in 2006, 2009, 2012 and 2015

Rank	2006		2009		2012		2015	
	State/territory	mean score	State/territory	mean score	State/territory	mean score	State/territory	mean score
1	ACT	418 (±14.3)	ACT	415 (±10.6)	ACT	429 (±13.2)	ACT	414 (±12.1)
2	NSW	411 (±12.5)	Vic.	398 (±9.2)	WA	406 (±9.5)	Tas.	414 (±11.7)
3	Vic.	408 (±10.2)	NSW	396 (±12.1)	Tas.	395 (±12.3)	NSW	411 (±8.6)
4	Tas.	406 (±12.1)	WA	393 (±9.6)	NSW	395 (±9.9)	WA	408 (±7.5)
5	SA	392 (±10.0)	Tas.	386 (±13.5)	Vic.	393 (±9.7)	Vic.	399 (±8.9)
6	Qld	387 (±8.6)	Qld	385 (±8.9)	SA	392 (±7.9)	Qld	398 (±10.6)
7	WA	381 (±10.0)	SA	380 (±10.4)	Qld	392 (±6.4)	SA	392 (±8.8)
8	NT	325 (±33.7)	NT	326 (±28.6)	NT	319 (±31.1)	NT	320 (±25.6)

Notes: Figures in parentheses refer to 95 per cent confidence intervals. Mean scores have been rounded. Ranking is based on mean scores before rounding. Nevertheless, the change in ranking order for the states and territories should be regarded as indicative only given that the differences in mean achievement between states and territories in 2015 were generally not statistically significant.

## Proficient standard

The proficient standard, Level 3.2, represents a 'challenging level of performance, with students needing to demonstrate more than minimal or elementary skills to be regarded as reaching it'.



The 2015 national results do not differ significantly from those of previous cycles, in terms of the distribution of student scores. Fifty five per cent of Year 6 students at the national level attained the proficient standard or better (51.4% in 2012). In Western Australia 57.7% of students reached or exceeded the proficient standard (56.4% in 2012). While none of the changes in these percentages between 2015 and 2012, and 2015 and 2009 were significant at the jurisdiction level, Western Australia was the only state in which the improvement between 2006 and 2015 was statistically significant (46.6% in 2006 to 57.7% in 2015).

In terms of ranking by percentage achieving the proficient standard, Western Australia moved from seventh position in 2006 to third position in 2009, second position in 2012 and third position in 2015. In 2006, 5.2% of Western Australian students were achieving at the highest two proficiency levels. This increased to 7.1% in 2009, 12.4% in 2012 and 12.9% in 2015.

## State and territory rankings by percentages of students at or above the proficient standard

Table 6.2 Jurisdictions by percentage of students at or above the proficient standard in rank order for 2006, 2009, 2012 and 2015

Rank	2006		2009		2012		2015	
	State/territory	Level 3.2 or above	State/territory	Level 3.2 or above	State/territory	Level 3.2 or above	State/territory	Level 3.2 or above
1	ACT	62.0 (±5.6)	ACT	61.2 (±4.8)	ACT	65.3 (±5.3)	ACT	60.5 (±5.1)
2	Vic.	58.3 (±5.0)	Vic.	54.6 (±4.6)	WA	56.4 (±4.2)	Tas.	59.1 (±4.7)
3	NSW	57.4 (±4.3)	WA	53.3 (±4.5)	Tas.	51.3 (±5.4)	WA	57.7 (±3.3)
4	Tas.	57.4 (±5.5)	NSW	53.0 (±5.0)	Vic.	51.3 (±4.7)	NSW	57.2 (±3.6)
5	SA	51.6 (±4.7)	Tas.	49.8 (±6.0)	SA	51.1 (±3.9)	Qld	54.3 (±4.6)
6	Qld	49.2 (±3.8)	Qld	48.8 (±3.8)	NSW	50.9 (±4.3)	Vic.	53.6 (±3.8)
7	WA	46.6 (±4.7)	SA	46.5 (±5.0)	Qld	49.9 (±3.3)	SA	50.7 (±3.9)
8	NT	38.4 (±6.5)	NT	33.6 (±7.5)	NT	31.0 (±7.6)	NT	31.8 (±5.6)
	<b>Aust.</b>	<b>54.3 (±2.1)</b>	<b>Aust.</b>	<b>51.9 (±2.2)</b>	<b>Aust.</b>	<b>51.4 (±2.0)</b>	<b>Aust.</b>	<b>55.1 (±1.8)</b>

Note: Figures in parentheses refer to 95 per cent confidence intervals. Nevertheless, the change in ranking order for the states and territories should be regarded as indicative only as the differences are generally not significant.

### Differences related to student characteristics

Of the student characteristics that might affect student performance, those with the greatest effects on science literacy were Indigenous status and geolocation. Due to the small numbers of students involved, the data for Indigenous status, geolocation and language background other than English is not disaggregated by jurisdiction.

#### Gender

For male and female students, there was a significant difference in mean achievement. Female students (408 points) performed better than male students (398 points) nationally. This is a change from 2012 when the mean for females was not significantly higher than males.

In every jurisdiction except Queensland the mean score for female students was significantly higher than male students in 2015. Western Australia had the largest difference between gender groups, with the mean score for female students (421 points) 28 points higher than that for male students (393 points).

Fifty seven per cent of males achieved the proficient standard (57% in 2012) while 56% of females (56% in 2012) achieved the proficient standard.

The pattern of results have remained relatively stable for the percentage of male and female students achieving various proficiency levels across the 2003 to 2015 assessments.

## **Indigenous status**

Across Australia, the already substantial difference in Science literacy mean scores between Indigenous and non-Indigenous students has decreased from 100 points in 2009 to 93 points in 2015. This difference remains statistically significant.

23.4 per cent of Indigenous students achieved the proficient standard compared to 57% of non-Indigenous students. The percentage of students achieving Level 2 or below was 32% for Indigenous students and 8% for non-Indigenous students.

## **Geolocation**

The geographic location of schools has a significant impact on performance in all tests, such that metropolitan students significantly higher mean scores than provincial students, who similarly had higher mean scores than students in remote and very remote schools.

The percentage of students achieving the proficient standard declines from 57.3% in the 'Metropolitan areas' and 50.6% in the 'Provincial areas' to 40.4% in the 'Remote and very remote areas'.

## **Language background other than English**

The mean performance of students for whom a language other than English was spoken at home was 9 points lower (mean=396), but not statistically different, than that for students with an English speaking background (mean=405). The differences were minimal (around 4%), and not statistically significant, in terms of the percentage of students achieving the proficient standard.

## **Key 2015 NAP–SL student survey findings**

The Student Survey on students' perceptions of and attitudes to science and their experiences of science learning at their school was administered as part of the 2015 assessment.

The NAP–SL survey provides rich insights into how students perceive and engage with science. Year 6 students show a high degree of agreement with the view of science outlined in the science as a human endeavour strand of the Australian Curriculum: Science. These views include a positive view of how women and men of all ages and from diverse backgrounds have a role within science.

The Student Survey was divided into 12 categories:

1. Interest in science
2. Self-concept in science
3. Value of science
4. The nature of science 1
5. Science-related activities outside school
6. Science-related activities at school
7. Science teaching 1
8. Science topics studied
9. Time spent on science
10. Science teaching 2
11. The nature of science 2
12. Who is involved in science

For Western Australian students the categories self-concept in science, value of science, science topics studied, the nature of science 2 and who is involved in science were significantly positively correlated with their achievement in science.

- Survey items related to students' self-concept in science (that is, the level of belief that students have in their own science competencies) had significant correlations with test performance in all states and territories.
- As in 2012, the student responses to a range of questions within these categories indicate a positive attitude towards this subject area exists. Approximately 80% of students responded, for example, that they would like to learn more science at school.
- While the great majority of students appear to be interested in learning about science and doing science, fewer students thought it would be interesting to be a scientist.
- The majority of students (69 per cent) reported having science lessons at least once a week, though 16% said they had science lessons less than once a week and 14% said 'hardly ever'.
- Consistent with the 2012 Student Survey, a large proportion of students showed a general appreciation of science but did not relate it to their own lives.

### MEDIA RELEASE

**Embargoed until 0100hrs 15 March 2017**

#### STUDENT PERFORMANCE IN SCIENCE REMAINS STATIC

Australian students' science literacy levels have remained static since they were last assessed, according to a new report card issued today by the Australian Curriculum, Assessment and Reporting Authority (ACARA).

Data from the National Assessment Program – Science Literacy assessments held in late 2015 show little change in national performance levels in terms of both average student achievement and the proportion of students performing at or above the proficient standard. The proficient standard is set at a challenging level and only just over half (55.1 per cent) of Year 6 students reached or exceeded it.

“The results show there is no statistically significant difference between the 2006 and 2015 results at the national level, or across most Australian states and territories. The exceptions being Tasmania, which is significantly higher than observed in 2009 and Western Australia which has maintained its significant improvement from 2006, and which was first seen in 2012,” said ACARA CEO, Robert Randall.

“The NAP science literacy report gives valuable insight into the level of science knowledge, understandings and skills that Year 6 students have developed. The results from this assessment, along with those from PISA and TIMSS (for which comprehensive reports were released today, following the high-level results late last year) highlight the need for improvements in primary school science teaching.

“That is why this report includes a chapter prepared specifically for teachers and curriculum specialists. It contains suggestions about how to improve science learning in the classroom, using the Australian Curriculum such as sample classroom lessons and activities, and ways of tracking and measuring student achievement against the science learning area.”



Other points from the report:

- Female students performed better than male students nationally. (In 2012, female students had a higher mean than male students, but it was not statistically significant.)
- As seen in previous assessments, Indigenous students had a statistically significant lower mean achievement than non-Indigenous students.
- Students from metropolitan areas have higher mean scores than students in provincial areas, who in turn have higher mean scores than students in remote and very remote areas.

When undertaking the sample assessment, students are surveyed to determine the extent of their interest in science, their engagement in science-related activities and their understanding of how science is relevant in their lives.

The results of the student survey show that the great majority of students (over 80 per cent) appear to be interested in learning new things in science, learning about science and doing science-based activities.

“This is a strong foundation on which to build student awareness of the importance of science in their everyday lives, build confidence, inspire excellence and encourage students to consider rewarding future careers in the field of science,” said Mr Randall.

Background to the National Assessment Program sample assessments

- NAP sample assessments test students’ skills and understanding in: Science, Civics and Citizenship and ICT literacy. NAP sample assessments began in 2003 and are held on a rolling three-yearly basis (i.e. one subject is tested every three years)
- Not every student in Australia is tested (hence the ‘sample’) – for this assessment around 5% of the Australian Year 6 student population is tested - of which student groups are randomly selected.
- Held in October and November 2015, this is the fifth report on Year 6 science literacy. It is the first time that content from the Australian Curriculum: Science has been specifically incorporated into the assessments.
- The 2015 Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) national reports were also released today, following the high-level results released at the end of last year.

**Media enquiries: 0414 063 872**