



## National Assessment Program Science Literacy Year 6 Report 2012

### Background

The fourth cycle of the Standing Council on School Education and Early Childhood's (SCSEEC) National Assessment Program in Science Literacy (NAP – SL) was conducted in October 2012. Previous NAP – SL assessments have been held in 2003, 2006 and 2009.

A sample of 2133 Year 6 students from 92 Western Australian schools representing all sectors were assessed to determine their levels of skills, knowledge and understandings in primary science.

Students completed a pen and paper assessment, a practical task that involved both group work and individually answered questions, and a 34-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 2012

#### Key test findings

- Science literacy at the national level has remained consistent across assessment cycles (2003, 2006, 2009 and 2012), both in terms of mean student achievement and the proportion of students performing at or above the proficient standard (Proficiency Level 3.2).
- 51.4% of students at the national level (53.3% in WA) attained the proficient standard or better.
- 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.
- For Western Australia, there was an increase in mean student achievement (by 25 score points) and the proportion of students performing at or above the proficient standard increased (by 9.8%) from 2006 levels.
- This means that in Western Australia, students' performance in science literacy has 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, and 7<sup>th</sup> to 3<sup>rd</sup> to 2<sup>nd</sup> in terms of meeting or exceeding the proficient standard.
- Nationally, non-Indigenous students achieved significantly higher levels of scientific literacy than Indigenous students, as was also the case in 2009 and 2006 (Mean score non-Indigenous students: 399; mean score Indigenous students: 303). This finding is similar to that of other NAPs.
- Across Australia, students living in metropolitan areas achieved the highest mean score in scientific literacy (Mean score metropolitan areas: 400; mean score provincial areas: 381; mean score remote and very remote areas: 349; Australian mean: 394). Similar findings are evident in all NAPs.
- As in 2009, there was no statistically significant difference in the achievement of students from English-speaking backgrounds and students from language backgrounds other than English.
- As in previous years, no significant difference was found in the mean achievement of males and females.

#### Key student survey findings

- As in 2009, the student responses indicate a positive attitude towards science. Approximately 80% of students responded, for example, that they would like to learn more science at school.
- A large proportion of students understand that science is more about finding out how things work (94%), doing experiments (83%), and solving problems (75%) than about remembering facts (57% down from 73% in 2009).
- However, the number of students who agree or strongly agreed that it would be interesting to be a scientist was 59% in 2012, down from 67% in 2009.

## Nature of the NAP – Science Literacy Assessment

A representative sample of Year 6 students was assessed to determine their levels of skills, knowledge and understandings in primary science. Nationally, 13 236 students from 633 schools representing all sectors in all states and territories participated, including 2133 students from 92 Western Australian schools.

Students were required to complete one of seven randomly assigned pen and paper assessments that included multiple choice and short answer items, as well as a practical task that involved both group work and individually answered questions. In addition, the students completed a 30-item survey regarding their perceptions of, and attitudes to, science and their experiences of science learning at their school.

### 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 2009 and 2012. Western Australia was one of four jurisdictions to improve their mean scores since 2009.

Australia's mean score decreased 6 points from 2006 to 2012. Western Australia was one of three jurisdictions to show an increase in mean score since 2006. Western Australia's increase of 25 points was the only statistically significant change.

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 and second in 2012.

## State and territory rankings by mean score

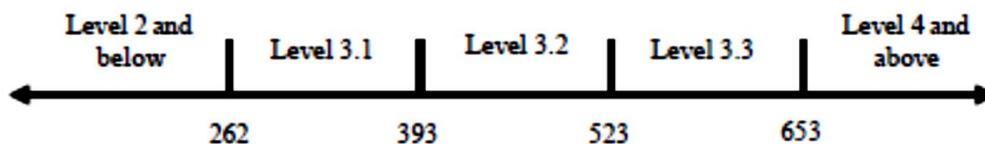
Table 3.5 State and territory mean score rankings in 2006, 2009 and 2012

Rank by jurisdiction mean score	2006		2009		2012	
	State/Territory	Mean score (±CI)	State/Territory	Mean score (±CI)	State/Territory	Mean score (±CI)
1	ACT	418 (±14.3)	ACT	415 (±10.6)	ACT	429 (±13.2)
2	NSW	411 (±12.5)	VIC	398 (±9.2)	WA	406 (±9.5)
3	VIC	408 (±10.2)	NSW	396 (±12.1)	TAS	395 (±12.3)
4	TAS	406 (±12.1)	WA	393 (±9.6)	NSW	395 (±9.9)
5	SA	392 (±10.0)	TAS	386 (±13.5)	VIC	393 (±9.7)
6	QLD	387 (±8.6)	QLD	385 (±8.9)	SA	392 (±7.9)
7	WA	381 (±10.0)	SA	380 (±10.4)	QLD	392 (±6.4)
8	NT	325 (±33.7)	NT	326 (±28.6)	NT	319 (±31.1)

Notes: Figures in parentheses refer to 95 per cent confidence intervals.  
Mean scores have been rounded.

## 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’.



In 2012, across Australia, 51.4% of Year 6 students reached or exceeded the proficient standard, a decline of 0.5% compared to 2009. Western Australia was the only jurisdiction to register an increase of students reaching or exceeding the proficient standard, from 46.6% to 53.3%.

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

Again, none of the changes from 2009 percentages at and above the proficient standard was considered statistically significant. However, Western Australia was the only state in which the improvement between 2006 and 2012 was statistically significant.

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

**Table 5.2** Jurisdictions by percentage of students at or above the proficient standard in rank order for 2006, 2009 and 2012

Rank by jurisdiction	2006		2009		2012	
	State/Territory	At or above the proficient standard	State/Territory	At or above the proficient standard	State/Territory	At or above the proficient standard
1	ACT	62.0 (±5.6)	ACT	61.2 (±4.8)	ACT	65.3 (±5.3)
2	VIC	58.3 (±5.0)	VIC	54.6 (±4.6)	WA	56.4 (±4.2)
3	NSW	57.4 (±4.3)	WA	53.3 (±4.5)	TAS	51.3 (±5.4)
4	TAS	57.4 (±5.5)	NSW	53.0 (±5.0)	VIC	51.3 (±4.7)
5	SA	51.6 (±4.7)	TAS	49.8 (±6.0)	SA	51.1 (±3.9)
6	QLD	49.2 (±3.8)	QLD	48.8 (±3.8)	NSW	50.9 (±4.3)
7	WA	46.6 (±4.7)	SA	46.5 (±5.0)	QLD	49.9 (±3.3)
8	NT	38.4 (±6.5)	NT	33.6 (±7.5)	NT	31.0 (±7.6)
	AUST	54.3 (±2.1)	AUST	51.9 (±2.2)	AUST	51.4 (±2.0)

Note: Figures in parentheses refer to 95 per cent confidence intervals.

### 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

In 2012, as in 2009, across all states and territories, females achieved slightly higher levels of Science literacy than males, in terms of mean score (1 point) while for the percentage achieving the Proficient Standard males were slightly higher than females (0.6%). As in previous years these differences are not significant.

In Western Australia, however, while the trend was similar, the difference between the mean scores of males and females resulted from an improvement by males of 8 points and an improvement by females of 18 points. Fifty seven per cent of males achieved the proficient standard (54% in 2009) while 56% of females (53% in 2009) achieved the proficient standard.

#### 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 96 points in 2012.

Twenty per cent of Indigenous students achieved the proficient standard compared to 53% of non-Indigenous students. The percentage of students achieving Level 2 or below was 33% 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 performed better than provincial students, who similarly performed better than students in remote and very remote schools. The differences between the mean score of students from Metropolitan areas and those in Provincial and Remote locations was statistically significant, while those between Provincial and Remote students was not.

The percentage of students achieving the proficient standard declines from 53% in the 'Metropolitan areas' and 47% in the 'Provincial areas' to 42% 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 lower (39 points), but not statistically different, than that for students with an English speaking background. The differences were minimal, and not statistically significant, in terms of the percentage of students achieving the proficient standard.

## 2012 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 2012 assessment. Analyses showed weak to moderate correlations between survey items and achievement.

The Student Survey was divided into 8 categories:

1. Interest in science
  2. Self-concept in science
  3. Value of science
  4. Perceptions of science
  5. Science-related activities outside school
  6. Science-related activities at school
  7. Science teaching and investigations
  8. Science topics studied at school
- As in 2009, 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.
  - Consistent with the 2009 Student Survey, a large proportion of students showed a general appreciation of science but did not relate it to their own lives.
  - Survey items related to the survey category 'self-concept in science' (i.e. the level of belief that students have in their science competencies) had the highest correlations with test performance. That is, higher science self-concept was associated with a higher mark in science literacy.
  - The responses to the Student Survey can provide impetus for discussion at school and jurisdictional levels regarding students' perceptions of, attitudes towards and experiences of science in their lives.