



## **Using Competition and Assessment Reports**

School reports are sent to each participating school. They contain detailed information about the performance of students at that school compared to participating students in their region.

This document uses the example of the school report of a fictitious school that has participated in the International Competitions and Assessments for Schools (ICAS) in Science. The format of the school report is common to all subject areas. An explanation is provided for each section of the report.

The report format provides schools and teachers with enhanced and accessible diagnostic information about student strengths and weaknesses both at individual and cohort levels.

Some information provided in the report is only available to schools that have entered 85% or more of their students in any one year level. Their reports allow comparative data tracking between each cohort from Years 2 to 12. This type of information for consecutive years of school is not available from any other assessment program in Australia.

# 2014 Science International Competitions and Assessments for Schools

## ABC Public School

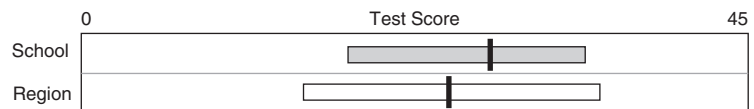
Reference to 'Region' in this report guide refers to the reporting region that a school has been assigned. A school's location determines a reporting region. A reporting region is required so the performance of a student can be appropriately compared to the results of all students in the same region.

Dear Principal

Thank you for taking part in the 2014 International Competitions and Assessments for Schools - Science. This report provides your school's results. Details about each year level that participated can be found on subsequent pages.

### Year 7

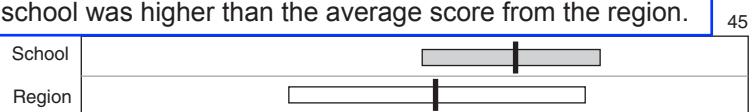
	School	Region
Average Score	27.6	24.8
Standard Deviation	5.7	7.5



The average score achieved by students at this school and by the students from the region. In this example, the average score achieved by Year 9 students at this school was higher than the average score from the region.

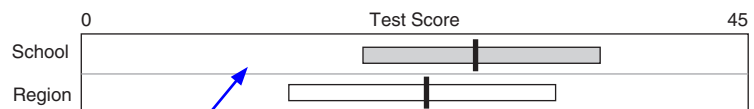
### Year 8

	School	Region
Average Score	29.3	23.9
Standard Deviation	4.6	7.4



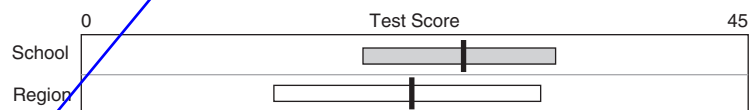
### Year 9

	School	Region
Average Score	26.6	23.3
Standard Deviation	5.5	6.9



### Year 10

	School	Region
Average Score	25.8	22.3
Standard Deviation	5.9	6.8

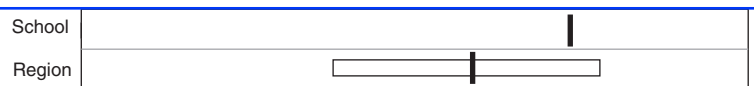


This is a graphical representation of Year 9 students from the school in comparison with Year 9 students of the region. The shaded upper bar shows students from this school and the lower white bar shows students from the region.

The length of the bar represents the range of scores achieved by 80% of students with the top 10% and the bottom 10% of scores removed. The vertical line represents the average score.

The bottom 10% is removed because it may include scores of students who have made no serious attempt or who may suffer some serious disadvantage. The upper 10% will include students who are well in advance of their peers. If the highest and lowest achievers are included the resulting graph would stretch from 0% to 100% and would not provide any information about the bulk of students.

	School	Region
Average Score	33.0	26.4
Standard Deviation	5.6	7.1



■ average score    □ performance range excluding the top 10% and bottom 10% (not shown if fewer than 10 students)

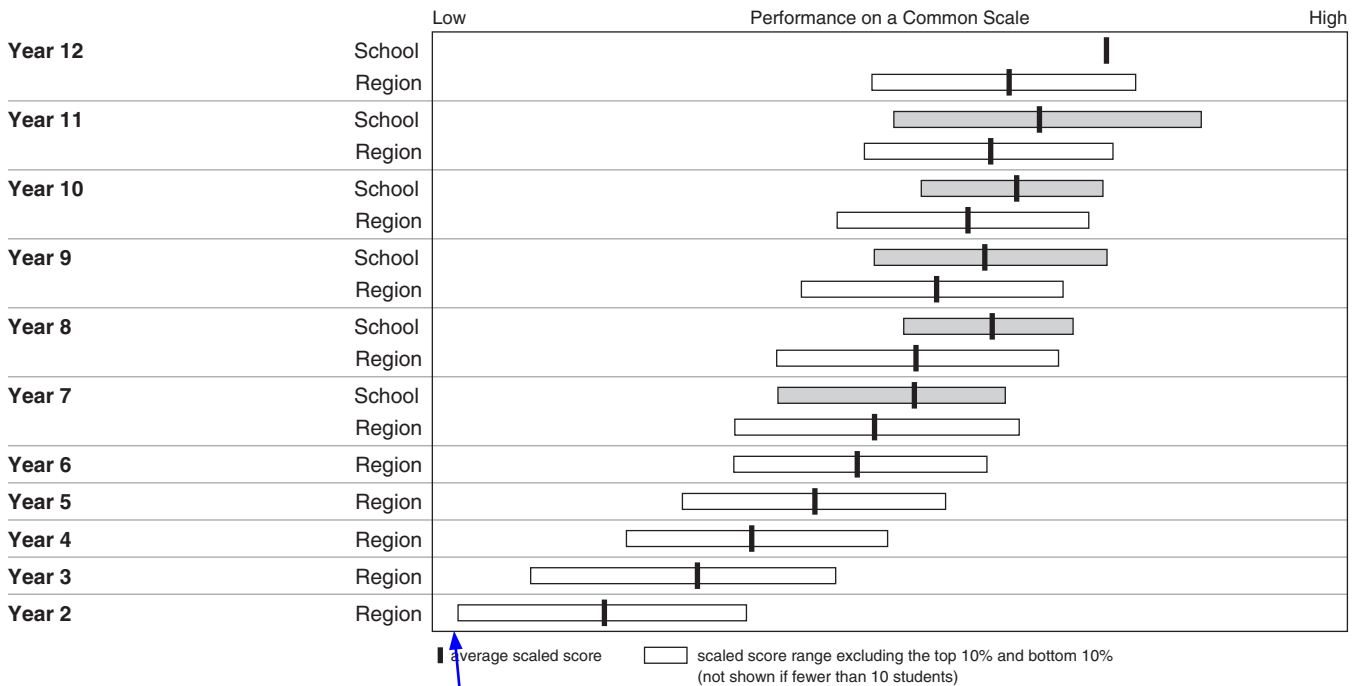
Students in your school received 4 High Distinction, 25 Distinction, 59 Credit, 12 Merit and 35 Participation certificates in the 2014 International Competitions and Assessments for Schools - Science.

### AWARD OF CERTIFICATES

High Distinction: top 1% of students in each year level in each region  
 Distinction: the next 10% of students in each year level in each region  
 Credit: the next 25% of students in each year level in each region  
 Merit: the next 10% of in each year level in each region  
 Participation: all others.

## 2014 Science - Year 2 to Year 12 - Results on a Common Scale

The graph below shows all year levels in Australia on a common scale.



This section compares the performance of each cohort of students from Year 2 to Year 12 within this school (if available) and within the region. The length of the bar represents the range of scores achieved within each cohort by 80% of students with the top 10% and the bottom 10% of scores removed. The vertical line represents the average score for the cohort.

To allow this comparison to be made, the scores of all students are placed on a common scale using a statistical method known as test equating. This method requires the use of questions that are common to two or more examination papers, called link items. This allows a series of pair-wise comparisons to be made between cohorts to place each cohort on a common scale.

This graph shows that, as we would expect, the average score increases for each successive cohort. Thus the average score for Year 10 students in the region is higher than the average score for Year 9 students, and the average score for Year 11 students is higher than for Year 10, and so on.

### NOTE

Comparative statistics may be misleading if only a small number of students participated in the Assessment. Some statistical procedures are unreliable if the population within a cohort is fewer than twenty so some types of reporting are not available to schools with low entry numbers.

Schools that have

- five or fewer entries in a Year level do not get any detailed statistics
- ten or fewer entries in a Year level do not get 80 per cent ranges (only the average is provided)
- twenty or fewer entries in a Year level do not get Strengths / Weaknesses provided.

#### Understanding the Common Scale

The common scale contains scores which are not raw test scores (such as 34 out of 50 marks) but scaled scores. Scaled scores represent raw scores that have been converted to fit a single common scale across year levels and calendar years.

Scaled scores are helpful because

- all students in all year levels can be compared on the same scale
- the scale is consistent from one year to the next, so student performance can be compared over time.

#### Construction of the Common Scale

The assessment papers for adjacent years have some questions in common. These questions are called link items. The link items provide information about the difficulty of the questions for different year groups in the same calendar year. This information is used to calculate the scaled scores for students across the different year levels.

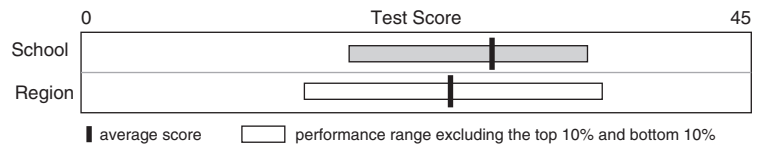
**Section 2.1 Year 7**

**2014 Science - Year 7 - Summary**

The graph below shows the performance of your Year 7 students

This section compares your students' performances in each of the skill areas assessed with the performance of all students who participated. Year 7 Science assesses skills in 5 areas: Observing/Measuring, Interpreting, Predicting/Concluding, Investigating and Reasoning/Problem solving. These skill areas are different for each subject.

	School	Region
Number Of Questions	45	45
Average Score	27.6	24.8
Standard Deviation	5.7	7.5



The standard deviation is a measure of the spread of students' scores. For a normal distribution, 68% of all scores lie within the range average plus or minus the standard deviation.

**Section 2.2 Year 7**

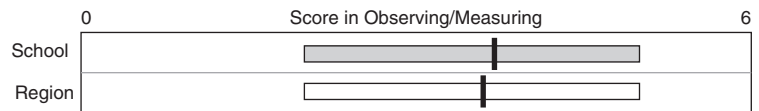
**2014 Science - Year 7 - Analysis by Skill Area**

The graphs below show the performance of your Year 7 students

In this case, 68% of the school's scores fall within the range 21.9 (27.6-5.7=21.9) to 33.3 (27.6+5.7=33.3), while for the region 68% of all scores fall within the range 17.3 to 32.3.

**Observing/Measuring**

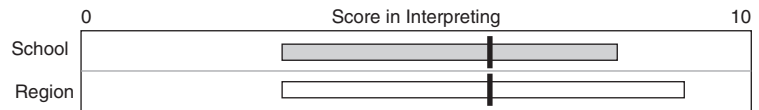
	School	Region
Number Of Questions	6	6
Average Score	3.7	3.6



Questions 1, 2, 5, 30, 36, 41

**Interpreting**

	School	Region
Number Of Questions	10	10
Average Score	6.1	6.1



This table compares the performance in the Investigating skill area, of students from this school with the performance of students from the region. The average score for this school (3.9) was slightly higher than for the region (3.4).

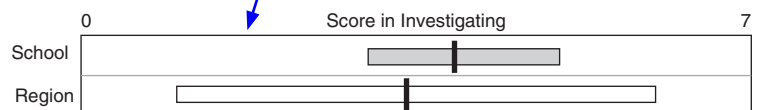
This graph compares the performance in the Investigating skill area, of students from this school with the performance of students from the region. In this example, the average score for the school is slightly higher than for the region. However, looking at the spread of scores, the difference between the average scores is probably too small to be statistically significant.

Average Score	3.9	3.4
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Questions 4, 9, 13, 19, 21, 25, 28, 31, 33, 37, 40, 42

**Investigating**

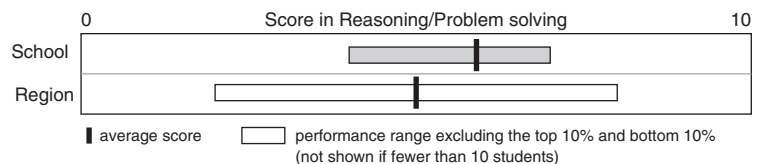
	School	Region
Number Of Questions	7	7
Average Score	3.9	3.4



Questions 3, 15, 16, 17, 22, 24, 34

**Reasoning/Problem solving**

	School	Region
Number Of Questions	10	10
Average Score	5.9	5.0



Questions 18, 23, 26, 27, 29, 35, 38, 39, 44, 45

## 2014 Science - Year 7 - Question Analysis

The table below lists all questions in order of difficulty.

The **Question content** column lists the skill each question is assessing.

	Question content	Area assessed	Question number	Correct answer	School percentage correct	Region percentage correct	Strength / weakness
Difficult Questions	Calculate which see-saw will be balanced	Reasoning/Problem solving	41	A	25	17	
	Compare the masses of different types of nuts	Predicting/Concluding	31	B	11	20	
	Draw a conclusion using information from a diagram	Predicting/Concluding	30	C	39	25	S
		Investigating	17	C	28	27	
		Predicting/Concluding	8	C	28	28	
		Reasoning/Problem solving	44	C	33	31	
		Reasoning/Problem solving	16	A	50	34	S
		Reasoning/Problem solving	39	A	42	36	
		Reasoning/Problem solving	45	B	64	37	S
		Predicting/Concluding	20	D	50	37	
	Measure the length of an object relative to the length of a known object	Observing/Measuring	24	B	50	39	
	Recognise that the density of an object is independent of its size	Predicting/Concluding	23	C	39	41	
	Draw a conclusion based on information in a graph	Predicting/Concluding	38	C	56	42	S
	Order the size of magnified beetles	Observing/Measuring	43	D	53	44	
	Identify factors affecting the rates of chemical reactions	Investigating	19	D	50	44	
	Calculate the duration of the transit of Venus	Interpreting	26	C	58	45	S
	Determine the variable to be kept constant to ensure a fair test	Investigating	27	A	58	45	S
	Interpret information in a graph	Interpreting	10	C	56	45	
	Deduce the output of a logic circuit	Reasoning/Problem solving	37	C	64	50	S
	Predict the result of a circuit	Observing/Measuring	7	B	75	52	S
	Determine the effect of a variable	Predicting/Concluding	15	D	58	54	
	Recognise features of a graph	Reasoning/Problem solving	29	C	64	55	
	Predict a characteristic of a material	Interpreting	21	C	53	56	
	Calculate an average	Reasoning/Problem solving	36	A	72	59	
	Determine the effect of a variable	Reasoning/Problem solving	40	D	72	60	
	Determine the effect of a variable	Interpreting	42	A	78	60	S
	Interpret information from a graph	Predicting/Concluding	28	D	86	61	S
	Draw a conclusion based on information in a graph	Predicting/Concluding					
	Infer the behaviour of a system	Predicting/Concluding					
	Use graphical information	Interpreting					
	Recognise ways to improve the accuracy of an experimental procedure	Investigating					
	Determine which vegetable best resembles the structure of lungs	Reasoning/Problem solving	13	A	69	64	
	Interpret information presented in a table	Interpreting	11	B	75	65	
	Draw a conclusion based on tabulated data	Predicting/Concluding	12	D	72	67	
	Interpret information from a food web	Predicting/Concluding	1	C	83	68	S
	Match an object to its density	Predicting/Concluding	22	B	75	68	
	Measure the length of a skull using a scale	Observing/Measuring	4	B	92	71	S
	Use the key provided to identify the type of bacterium	Interpreting	9	B	75	72	
	Describe the motion of an object moving under the influence of gravity	Interpreting	34	D	78	72	
	Predict a flight time from tabulated data	Predicting/Concluding	33	D	86	73	S
	Complete a flow chart	Interpreting	18	B	89	73	S
	Use information provided to solve a problem	Reasoning/Problem solving	6	D	69	78	
	Arrange a number of objects in order of size	Observing/Measuring	5	D	94	79	S
	Interpret information provided in a graph	Interpreting	3	D	89	80	
	Measure a geological feature using a scale provided	Observing/Measuring	2	A	89	80	
Easy Questions							

The **Area assessed** column lists the border skill area which each question is assessing. There are four skill areas in Year 7 Science Other subjects will have different skill areas.

The **Question number** column lists each question with the most difficult at the top and the least difficult at the bottom according to the region's scores. The most difficult question was Q41 with 17% of students in the region giving the correct answer, 25% of students at the school gave a correct answer for this question. The least difficult question was Q2 with 80% of students from the region and 89% of students at this school giving the correct response.

The **correct answer** column lists the correct answers. A, B, C or D for multiple choice questions.

### Understanding Question Difficulty, Strengths and Weaknesses

Question difficulty is determined by the number of students in the Region who answer the questions correctly. Strength in a question (indicated by 'S') means that students in your school performed significantly better on that question compared to the performance of students in the Region. Weakness in a question (indicated by 'W') means that students in your school performed poorly in comparison. Strengths and weaknesses are not shown if fewer than 20 students from your school participated.

# 2014 Science - Year 7 - Student Response Analysis

The skill area assessed by the question is listed in the **Area assessed** column.

The table below provides a detailed description of the skill assessed by each question and the percentage of your students who chose each response option. The correct answer is the white, unshaded option.

Question content	Area assessed	School percentage				Non attempt
		A	B	C	D	
1 Interpret information from a food web	Predicting/Concluding	3	8	83	6	0
2 Measure a geological feature using a scale provided	Observing/Measuring	89	6	3	3	0
3 Interpret information provided in a graph	Interpreting	0	0	11	89	0
4 Measure the length of a skull using a scale	Observing/Measuring	6	92	0	3	0
5 Arrange a number of objects in order of size	Observing/Measuring	0	3	3	94	0
6 <b>The Question content column lists a detailed descriptor of the skill assessed by each question.</b>	Reasoning/Problem solving	14	6	11	69	0
7	Observing/Measuring	25	75	0	0	0
8	Predicting/Concluding	44	25	28	3	0
9	Interpreting	14	75	8	3	0
10 Interpret information in a graph	Interpreting	17	25	56	0	3
11 Interpret information presented in a table	Interpreting	17	75	6	3	0
12 Draw a conclusion based on tabulated data	Predicting/Concluding	11	11	6	72	0
13 Determine which vegetable best resembles the structure of lungs	Reasoning/Problem solving	69	19	6	6	0
14 Infer the behaviour of gases	Predicting/Concluding	6	0	86	8	0
15 Determine the direction of forces to produce synclines and anticlines	Predicting/Concluding	6	11	25	58	0
16 Draw a conclusion about the relative age of rock strata	Reasoning/Problem solving	50	47	0	3	0
17 Recognise features of a fair test	Investigating	11	22	28	39	0
18 Complete a flow chart	Interpreting	0	89	3	8	0
19 Identify factors affecting the rates of chemical reactions	Investigating	17	14	19	50	0
20 Predict the angle at which a ray will be reflected	Predicting/Concluding	6	33	11	50	0
21 Predict a change in mass	Interpreting	42	6	53	0	0
22 Match an object		19	75	0	6	0
23 Recognise that		3	0	39	58	0
24 Measure the le		11	50	33	6	0
25 Draw a conclus		6	6	14	75	0
26 Calculate the d		17	17	58	8	0
27 Determine the		58	33	6	3	0
28 Interpret inform		6	3	6	86	0
29 Recognise feat	olving	14	17	64	6	0
30 Draw a conclus		11	47	39	3	0
31 Compare the m		22	11	8	58	0
32 Use graphical c		6	14	81	0	0
33 Predict a flight		3	6	6	86	0
34 Describe the m		6	14	3	78	0
35 Recognise way		19	0	17	64	0
36 Calculate and c	olving	72	22	3	3	0
37 Deduce the ou	olving	6	28	64	3	0
38 Draw a conclus		0	8	56	36	0
39 Recognise a st	olving	42	19	11	28	0
40 Determine the	olving	3	3	22	72	0
41 Calculate which	olving	25	25	44	6	0
42 Determine the		78	17	3	3	0
43 Order the size		19	14	14	53	0
44 Recognise the	olving	28	31	33	8	0
45 Use a formula	olving	22	64	8	6	0

These columns list the responses, both correct and incorrect, to the multiple-choice questions of students from this school. The correct answer to each multiple-choice question is found in a white, unshaded cell. Each multiple choice question has only one correct response (the key). The incorrect response (the distractors) are in the shaded cells. The non-attempt cell lists the percentage of students who did not select one of A, B, C or D.

In this example, the correct answer to Question 20 is D. The correct answer was chosen by 50% of students in this school. The distractor A drew 6% of students, distractor B drew 33% of students and distractor C drew 11% of students. No students made a non-attempt.

Distractors are plausible but incorrect options that are designed to appeal to the unprepared candidate. Distractor analysis is a powerful tool made available to teachers in this report. An analysis of the reasons students had for choosing a distractor could point to specific weaknesses in student understanding of the subject. Analysis of the number of non-attempt may also be useful.

**Understanding Student Response Analysis**

For each multiple choice question there are four response options. The correct answer is the white, unshaded option. Incorrect options are called distractors and are shown in grey. Examining the distractors can give a useful insight into the type of assistance needed by students who have answered a question incorrectly. For example, if a number of students answered 'B' where the correct response was 'A', examining the distractor 'B' can help identify a lack of skill or understanding that led the students to the wrong response.

**Section 2.5 Year 7  
2014 Science**

Percentile rank indicates where each student is placed in relation to other students both from this school and its region. Students receive awards based on their percentile rank in the region.

The table below lists all students ordered by class (if provided) and then by name.

	Class	Student Name	Score	Award	School percentile	Region percentile
135	C	KAREN, HARPOON	28	Credit	60	66
134	E	PETER, PRESNER	28	Credit	60	66
133	H	PRITAM, PARVIN	33	Credit	87	86
132	H	SHIWAKRISHNAN, BRIAN	29	Credit	67	71
131	H	STCLAIR, SEAN	26	Merit	40	57
130	L	DE SOUZA, DISHA	34	Distinction	93	89
129	O	CHANDRA, AVISHEK	26	Merit	40	57
128	T	CHEE, CHARMAINE	37	Distinction	99	96
127		BALI, SHAMAR	22	Participation	20	39
126		CASER, PAUL	18	Participation	13	23
125		BHAVESH, RAM	17	Participation	7	19
124		KRISHNA, ARESH	27	Merit	47	62
123		HA, LUCIDNA	31	Credit	73	79
122		PERERA, ROSHIN	33	Credit	87	86
121		YEE, VALERIE	25	Participation	27	53

TAP-ID	PIN
0123-4567-89	1234
0123-4567-89	1234
0123-4567-89	1234
0123-4567-89	1234
0123-4567-89	1234
0123-4567-89	1234

Awards are granted to students who are placed in the following percentile bands:  
 High Distinction (99% to 100%)  
 Distinction (89% to 98%)  
 Credit (64% to 88%)  
 Merit (54% to 63%)  
 Participation (0% to 53%)

Shamar Bali is placed at the 20th percentile of the school and at the 39th percentile for the region. Because the average score for Shamar Bali's school is higher than the average score for the region, it is likely that students will be ranked higher in the region than in the school. Shamar Bali was awarded a Participation based on their percentile rank.

**NOTE:**  
 Students placed at the 100th percentile are students who have achieved the highest scores\*. Students are ranked according to their scores so that those who are placed in the lowest percentile will have scores lower than the rest of their peers.  
 \* Students who fall within the 100th percentile may not necessarily be eligible for medals. Teachers should seek confirmation from EAA.

**Student Reports**

Individual student reports and certificates can be found at the end of this school report. The running number shown on the left is also printed in the bottom right corner of each student report so you can easily find the corresponding student report (numbers are in descending order). Each student has an individual TAP-ID and PIN. They are listed here for your reference only and should be held securely. The TAP-ID and PIN are printed on the student letter and can be used by parents to logon to online reports for students.

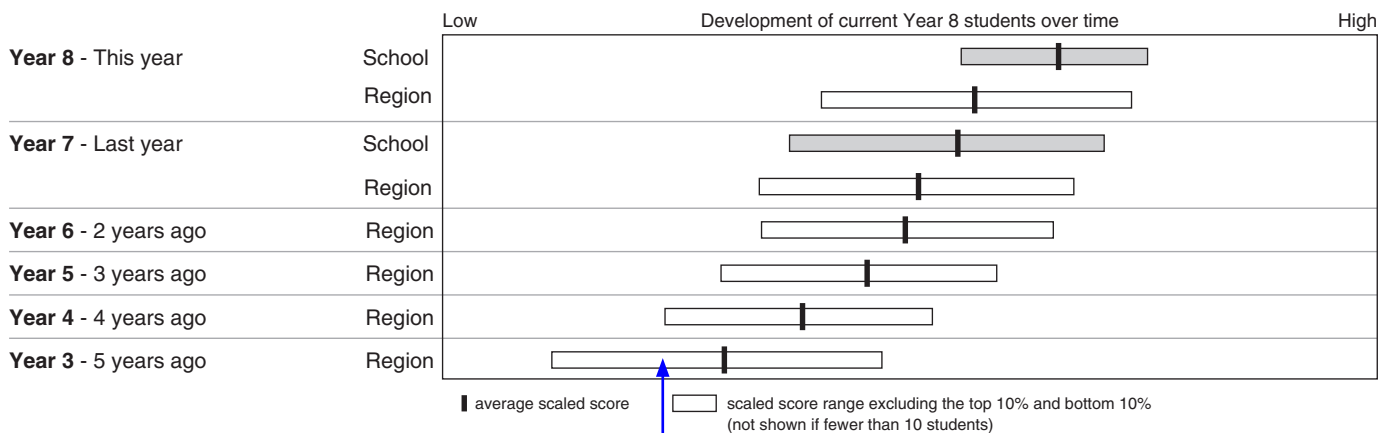




**Section 2.7 Year 8**

**2014 Science - Year 8 - Development of Students Over Time**

The graph below shows the development of current Year 8 students for the past seven years. Schools that have participated for eight or more years can access this additional information online.



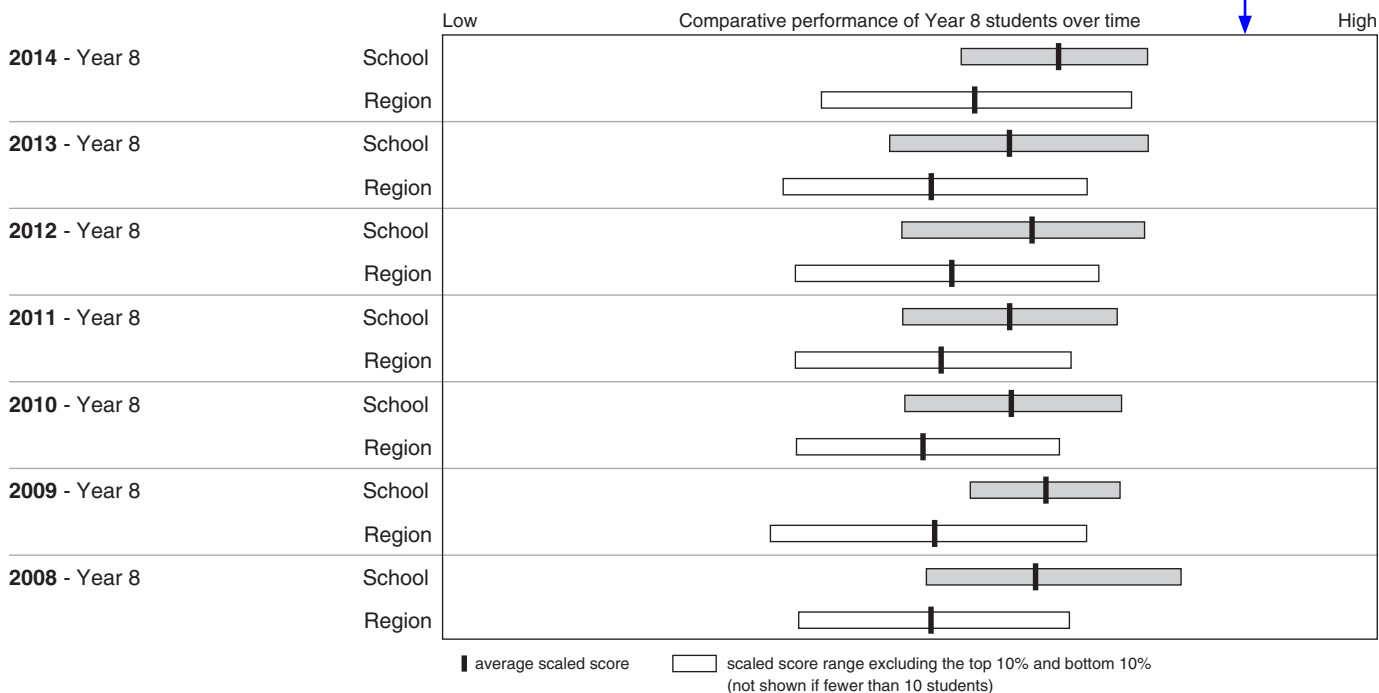
This graph compares the performance of this Year 8 group of students in this school\* over a number of years with corresponding students in the region. In this example the current Year 8 students in this school are compared with their region performance in the previous years (when they were in Year 7 to Year 3). The average performance of all students measured on the same scale has improved over time.

This graph compares the performance over a number of years of different groups/Year levels in this school with corresponding students in the region. In this example the performance of Year 8 students in the school are compared to all Year 8 participants in the region in the previous seven calendar years (if available). This allows you to answer questions like 'Is this year's Year 8 doing as well as last year's Year 8?'

**Section 2.8 Year 8**

**2014 Science - Comparison of Year 8 Students Over Time**

The graph below compares the performance of Year 8 for the past seven calendar years. Schools that have participated for eight or more years can access this additional information online.



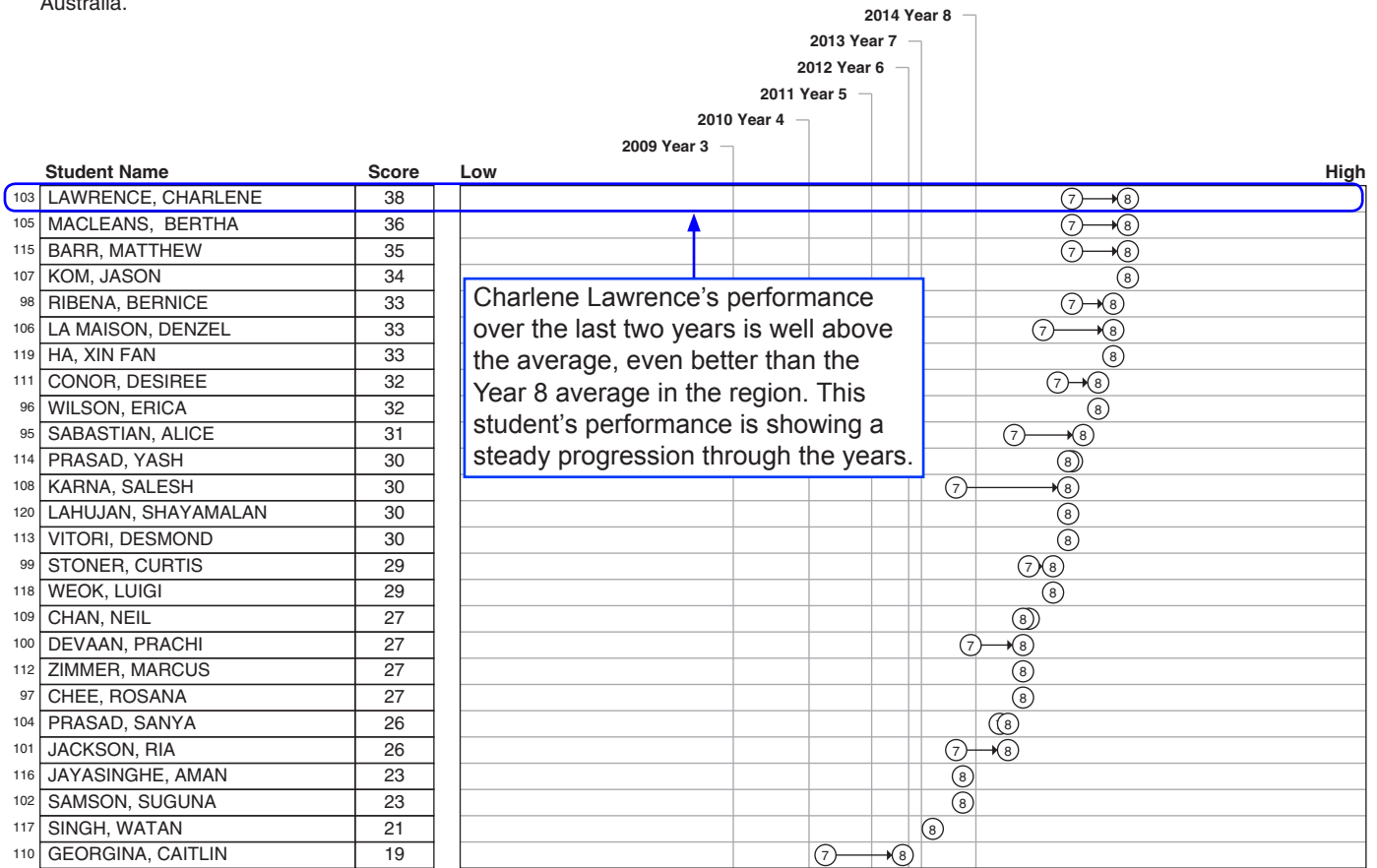
\*The performance of any group from one year to another may not be strictly comparable because exactly the same students may not be present in successive years due to transfers and absences, but broad comparisons can be made.

Section 2.9 Year 8

# 2014 Science - Year 8 - Individual Student Development

The table below lists all students ordered by raw score and shows the development of current Year 8 students.

The circles ○ show the individual student performance for each year they participated. Each vertical line shows the average performance in Australia.



Charlene Lawrence's performance over the last two years is well above the average, even better than the Year 8 average in the region. This student's performance is showing a steady progression through the years.

This table lists all students from a single cohort within the school. The students are ordered from the highest raw score at the top of the table down to lowest raw score.

Individual student's performance is indicated by a circle which should be compared to the regional average performance for that year.

The graph shows the performance of each individual student over a number of years. The vertical lines show the average performances for the region for each year. In this case the lines show the averages for the past years when these students were in Year 7, Year 6, Year 5, Year 4 and Year 3.

# 2014 Science

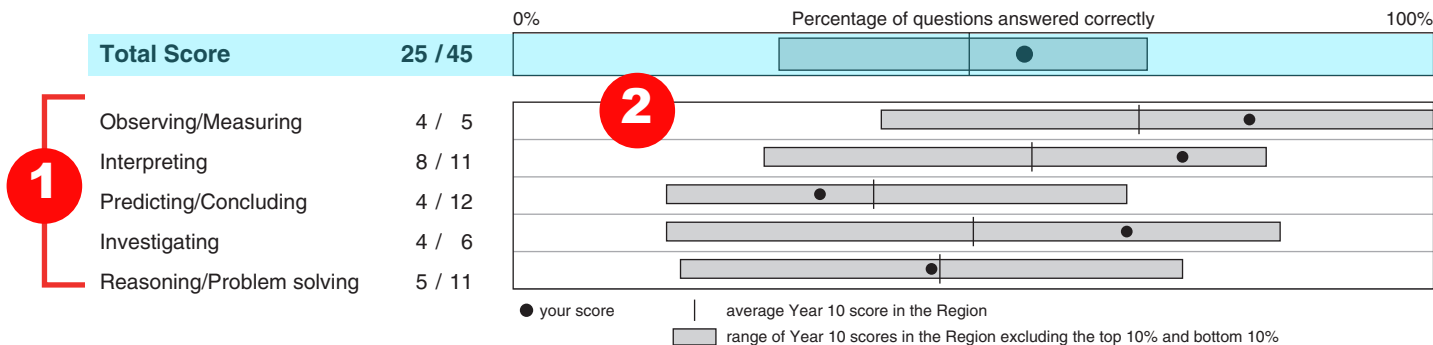
## International Competitions and Assessments for Schools

Dear Arnesh

Thank you for participating in the 2014 International Competitions and Assessments for Schools - Science. You scored **25 out of 45**. Your score was **in the top 33 percent** of Year 10 participants in the Region.

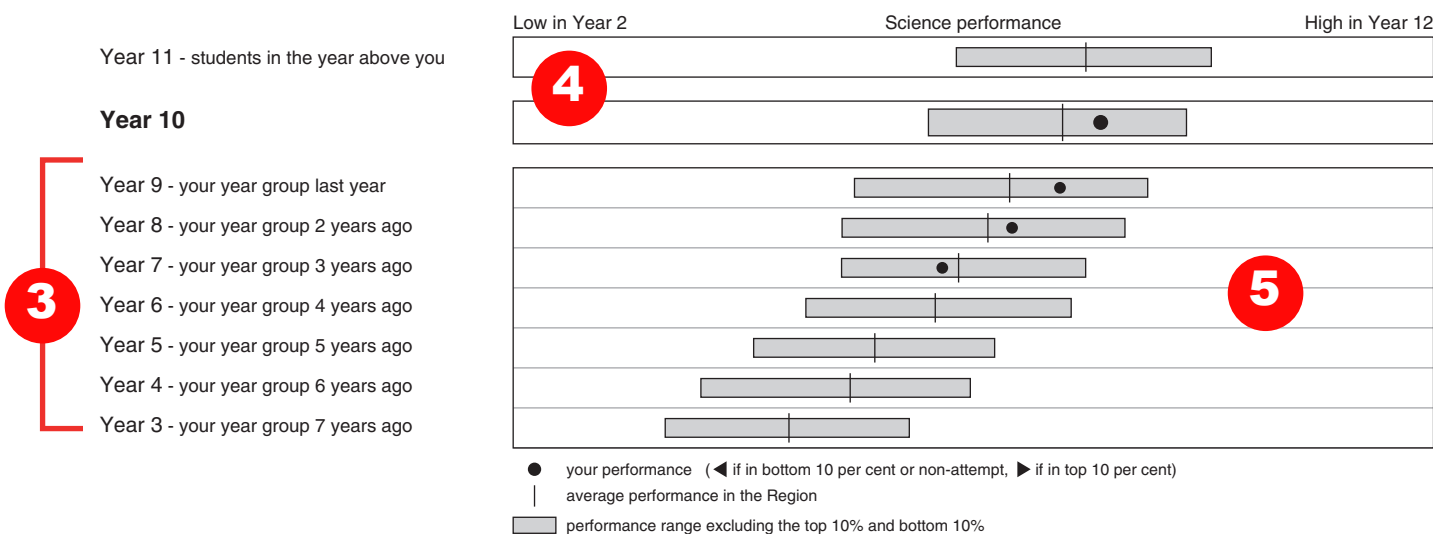
### 2014 Science Performance

The graph below shows your **2014 Science score** and your performance in each of the different areas assessed.



### Comparative Science Performance

Students in the Region from Year 2 to Year 12 participated in the International Competitions and Assessments for Schools - Science. The graph below compares your performance to year levels above and below (where available for the last eight years).



- 1** This section compares Arnesh's performance in each of the skill areas with the performance of all students who sat ICAS-Science. The graph indicates which areas may be strengths and weaknesses for Arnesh.
- 2** Arnesh performed above average in Observing/Measuring, Interpreting and Investigating but is below average in the skill areas of Predicting/Concluding and Reasoning/Problem solving. This result indicates the areas where Arnesh can improve.
- 3** This section tracks Arnesh's performance in previous years. This allows for the measurement of Arnesh's progress over time, relative to the other students in Arnesh's year.
- 4** This graph compares Arnesh's performance this year to the performance of the other Year 10 students.
- 5** Arnesh has shown significant progression since Year 7. When he was in Year 7, Arnesh was below the year average. In Year 8, Arnesh improved over Year 7 and managed to achieve a score above average. Arnesh continued to achieve a score above average in Year 9 and Year 10.