

Wānangatia te Putanga Taurira National Monitoring Study of Student Achievement

The National Monitoring Study of Student Achievement is designed to assess and understand achievement across the curriculum at the primary level in New Zealand English-medium state schools. Data is gathered from approximately 5000 Year 4 and Year 8 students at 200 randomly-selected schools throughout New Zealand. Each year the assessment programme focuses on two learning areas of the New Zealand Curriculum. This overview provides a snapshot of findings from the data collected in Term 3 2012 to describe aspects of student achievement, and factors that may influence that achievement, in English: writing and in science.

ASSESSMENT OF ENGLISH: WRITING

The assessment for writing focused on two aspects. The *Writing for a Variety of Purposes* assessment required the students to respond to one of five prompts to explain, persuade or recount. The data collected from this assessment determined the extent to which students used a range of processes in their own writing. All students were assessed according to pre-determined rubrics.

For SCIENCE see page 5



Key findings

- Year 4 students' writing scores ranged across Curriculum Levels 1 to 3 with the greatest proportion scoring in Level 2. Year 8 students' writing scores ranged across Curriculum Levels 2 to 4 with the greatest proportion achieving in Level 3.
- Of the five different writing purposes assessed, Year 4 students did least well at writing a persuasive piece and best at writing a recount. Year 8 students did least well when writing an explanation or a descriptive piece than when writing for the other three prompts.
- Achievement varied by gender, ethnicity and school decile. For both year levels average achievement was higher for girls than boys, lower for Māori and Pasifika students than for non-Māori and non-Pasifika students respectively, and was lower for students from lower decile schools. However, there were no differences between the average scores

in writing for NZ European, Māori and Pasifika groups in low decile schools.

- Overall, Year 4 students were more positive about writing than Year 8 students. Girls were generally more positive than boys at both year levels, and Pasifika students were more positive than NZ European and Māori students at both year levels. However, there was no statistical relationship between student achievement and their attitudes to writing.

ACHIEVEMENT OF ...

Māori students

- The average score of Year 4 Māori students in the sample was just within Curriculum Level 2 and in Year 8, the average score was within the upper portion of Level 3 (as for All Students¹).
- Māori girls scored higher than boys and Māori students at high decile schools scored higher than those from low decile schools.
- Approximately 40 percent of Māori students scored above national averages for writing. At Year 4 the above average group included more girls than boys and came evenly from across the full range of school deciles. At Year 8 the same pattern held for gender, but the majority of students came from mid decile schools.
- Just over 80 percent of all Māori students in the sample attended low and mid decile schools. This contrasts with just over 50 percent of NZ European students attending low or mid decile schools. When these figures are accounted for they show that, as for All Students, a higher proportion of Māori students attending high decile schools scored above the national average than at mid or low decile schools.

Pasifika students

- On average, Pasifika students in the sample scored lower than All Students at both year levels. However they showed a similar rate of progress to All Students.
- Writing achievement varied at both year levels for Pasifika students depending on the amount of English spoken at home. Students who spoke English at home 'always' or 'often' tended to achieve at a higher level than those who spoke English at home 'sometimes' or 'never'.
- There was little difference in average scores for Pasifika students at Year 4 with respect to the type of school they were attending. Year 8 average scores, however, were higher for those Pasifika students attending full primary schools than for Pasifika students in intermediate schools.
- For *Writing for a Variety of Purposes*, a little over 50 percent of Year 4 Pasifika students achieved in Level 2 or above, compared to 65 percent of All Students. A third of Year 8 Pasifika students achieved within Level 4 or above (as for All Students).

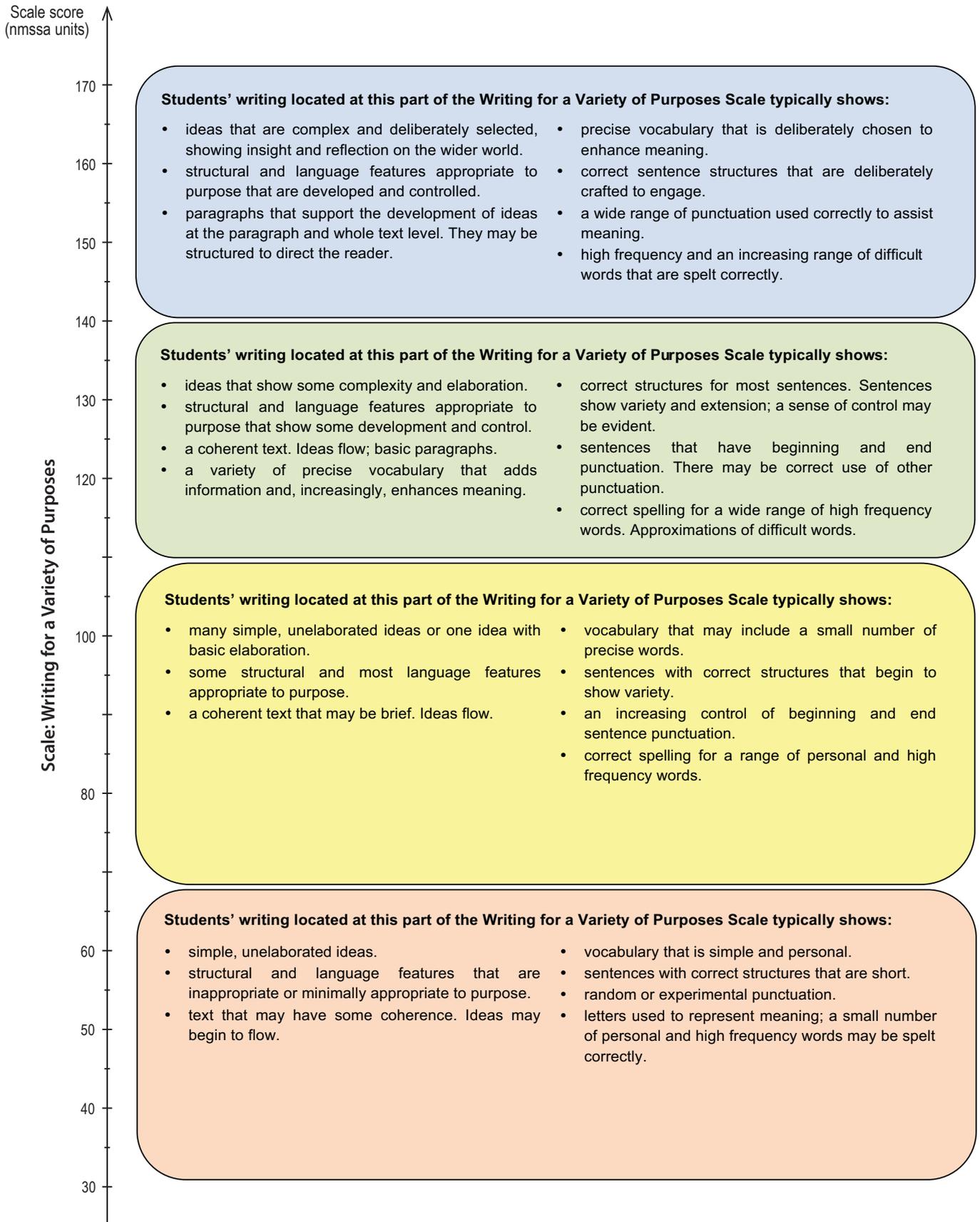
Students with special education needs

- For the first time in National Monitoring in New Zealand, students with high and moderate special education learning needs, and students 'on referral'² have been identified. Although the numbers of students with high learning needs were modest, students with moderate needs made up 8 percent of All Students at Year 4 and 5 percent at Year 8.
- At Year 4, all students with high special education needs, and nearly three quarters of students with moderate special education needs achieved within Curriculum Level 1. The remainder achieved at Level 2 or 3.
- At Year 8, over one third of students with high special education needs achieved within Curriculum Level 2 or 3. Just over one third of students with moderate special education needs achieved within Curriculum Level 3 or 4.
- Students identified as being on referral performed in very similar ways to All Students.
- Year 4 teachers reported using specialist advice to adapt the curriculum for learners with special needs more often than Year 8 teachers did.

NOTE: See page 4 for footnotes

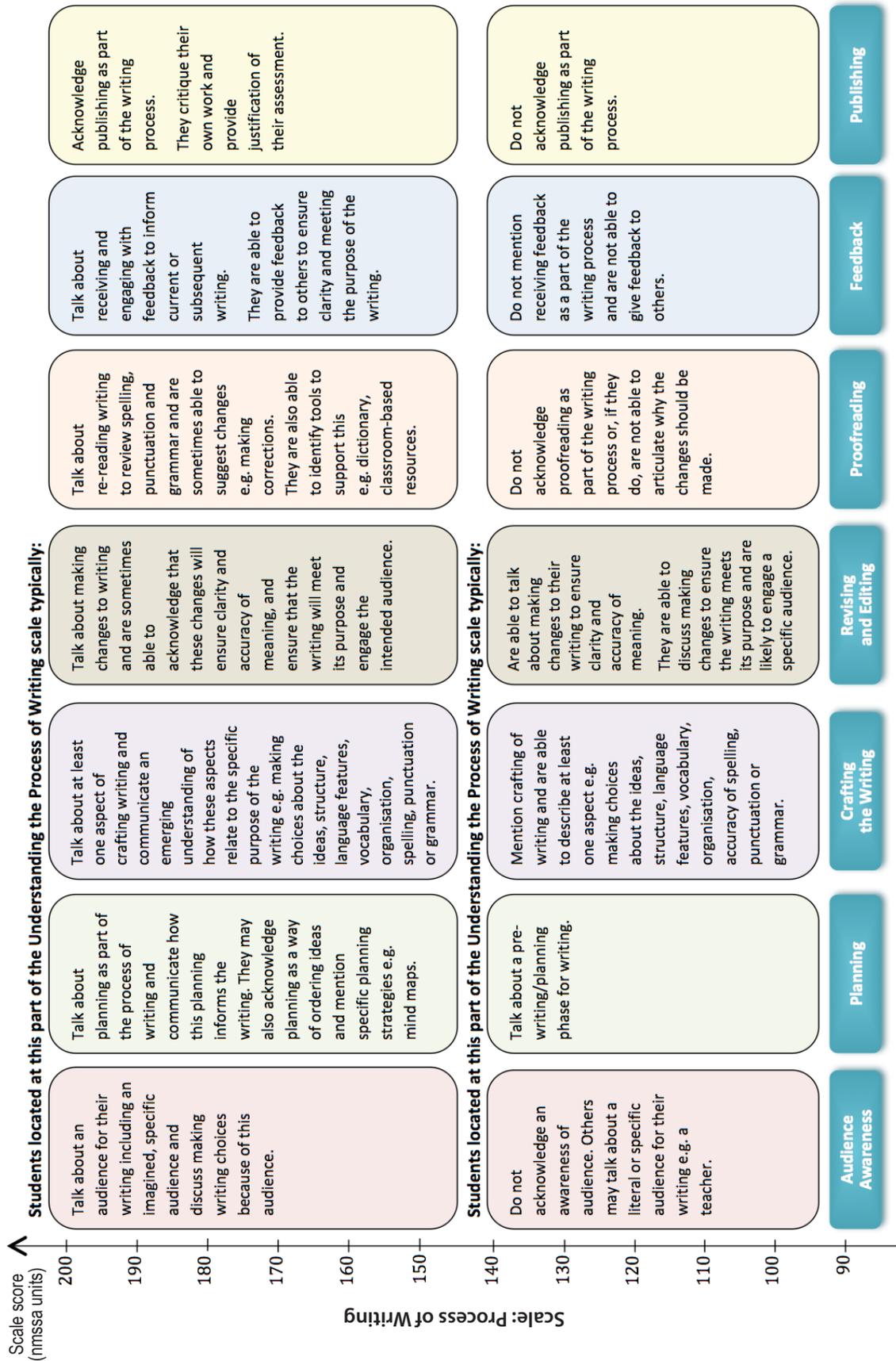
Scale description for Writing for a Variety of Purposes

The scale description describes the *Writing for a Variety of Purposes* scale. The scale is divided into four broad bands, each describing the qualities of student writing associated with that part of the scale.



Scale description for Process of Writing

This scale description describes the *Process of Writing* scale. The description is divided into two broad bands and seven themes to represent the different elements involved in the assessment.



Teacher Questionnaire

A random sample of teachers answered a questionnaire to provide insight into teachers' experiences and attitudes regarding the teaching of writing.

- Teachers were very positive about writing and were confident as teachers of writing.
- Teachers of Year 4 students mostly reported the use of remedial activities outside the classroom and Year 8 teachers the use of extension activities outside of the classroom, when describing ways of meeting individual student needs.
- Most teachers reported that they were regularly involved (once a term or more) in a range of professional interactions that supported their teaching of writing. This included working together to plan and prepare, discussing useful approaches to teach writing, and discussing samples of students' work.
- Over 80 percent of Year 4 teachers and 75 percent of Year 8 teachers reported that they were involved in professional development and learning focused on writing in the last 12 months. This is substantially higher than the level of science PLD reported by teachers in NMSSA Science (2012).

Example of an interview for 'Process of Writing'

My Writing

There are quite a few things we need to be able to do, so that the things we write are good for people to read.

1. Tell me all of the things about this piece of writing that you think you have done well.
2. Is this writing better than you normally write, not as good, or about the same?
3. Why do you say that?

Most of us can make changes to the things we write. Think about the things you could do to make this writing clearer or more interesting for a reader. Write a number beside each place or part where you could make a change, then we will talk about the changes you could make.

Write 1 beside the first place, 2 beside the second place, and so on.

Now let's talk about the changes you could make to what you have written.

4. Tell me about each change. What change could you make and why you would do that?
5. Are there any other big changes you could make?

Now think about how you could improve **all** of the writing you do - like stories, reports and other things you write in your class; not just this piece.

6. What would be two or three of the main things you would like to improve in your writing?

Example of a prompt for 'Writing for a Variety of Purposes'

Wanting Something

Write to *narrate* (tell) a story in which the main character really wants something but can't have it.

What do they want? Why do they want it? Who or what is stopping them from having it? How does it all end?

Think about:

- where your story is set
- who your characters are – what they do, what they say, and how they think and feel
- the problem and how it is resolved (happily or not)
- the order of your ideas and how they are linked

Remember to:

- choose your words carefully
- take care with your spelling, punctuation and sentences
- edit – add or delete words or sentences to improve your work

FOOTNOTES:

1. Students from the priority learner groups: Māori, Pasifika and special education needs, are reported on separately as well as being part of the national sample. When comparisons are made, the national sample is referred to as 'All Students'.

2. Participating schools were asked to identify students who had special education needs as:

- High special education needs: for example, ORS funded, Supplementary Learning Support, severe behaviour or communication assistance from Special Education.
- Moderate special education needs: for example, provided with a teacher aide from school funds, on the case load for Resource Teachers: Learning and Behaviour (RTL), or Child Youth and Family Services (CYFS).
- On referral: for example, to Special Education or CYFS with action pending.
- Students not falling into any of the above categories were assigned to a 'no special education needs' group.

Overall, the numbers in this group are relatively small and the findings should therefore be interpreted with caution.

3. The NMSSA science achievement scores were aligned with the science curriculum by a panel of New Zealand science education experts. The panel identified a series of cut-off points to make distinctions between Emerging Curriculum Level 1/2 and Developed Curriculum Level 1/2 and Emerging Level 3/4 and Developed Level 3/4.

ASSESSMENT OF SCIENCE

The assessment for science focused on two aspects. The *Knowledge and Communication of Science Ideas* assessment was a paper-and-pencil assessment addressing science knowledge, communicating science ideas from the Nature of Science strand and using science knowledge, incorporating the key competencies of thinking and using language symbols and texts.

The *Nature of Science* assessment was an interview and activity based assessment to determine the extent to which the students have developed the understandings and competencies described by the Nature of Science themes of the New Zealand Curriculum.

Students also answered a questionnaire about their attitudes and learning opportunities in science.

Key Findings

- The average achievement of Year 4 students was within the Developed Curriculum Level 1 and 2 band, while for Year 8 students the average achievement was within the Emerging Curriculum Level 3 and 4 band³.
- Students in high decile schools showed greater progress between Year 4 and Year 8 than those in low decile schools.
- Average scores were lower for Māori and Pasifika students than for non-Māori and non-Pasifika students respectively. Average scores were also lower for students from lower decile schools.
- Achievement in science was similar for boys and girls.
- Overall, students at Year 4 reported a more positive attitude to science than at Year 8. This is consistent with the findings from TIMSS and NEMP.
- Although the relationship between attitude to science and achievement was not strong, it was greater for Year 8 than Year 4 students. On average, students in the lowest and middle attitude groups scored lower than those in the highest attitude group.
- Students who always spoke English at home were more likely to achieve at a higher level at both Year 4 and Year 8 than students who spoke English at home 'sometimes' or 'never'.
- Fewer students and teachers at Year 4 than Year 8 reported opportunities for hands-on science activities, such as doing science experiments or using specialist science equipment in school. Students reported that they most frequently accessed science information by listening to their teachers, followed by independently accessing information or using information from their family and whānau.

ACHIEVEMENT OF ...

Māori students and Pasifika students

- Māori and Pasifika students were positive in their attitudes to learning science.
- Although Māori and Pasifika students achieved at a lower level, on average, than NZ European students, progress between Year 4 and Year 8 was similar for all groups.
- Māori and Pasifika students attending high decile schools were more likely to score above average on the science measures than Māori and Pasifika students in middle or low decile schools. This reflects the relationship between achievement and school decile described for achievement in writing.
- Girls and boys achieved at similar levels at Year 4 and Year 8 in both Māori and Pasifika groups. Girls and boys were almost equally represented in the groups of Māori and Pasifika students who scored above average at each year level, except for Pasifika students at Year 4, where about 60 percent of the above-average group were girls.



Students with special education needs

- At both year levels, students with high or moderate special education needs achieved at a lower level, on average, than those on referral or with no special education needs². However, the overlap between the groups indicated that there were students, particularly those with moderate special education needs, who were achieving at the same level as students with no special education needs. Students identified as being on referral performed in very similar ways to All Students.
- At both year levels, 17 percent of students with moderate special education needs and about 50 percent of students on referral achieved above the national averages. These students tended to come from mid and high decile schools, as was the case with All Students.

Scale description for Nature of Science

This scale description describes the specific knowledge and competencies required to successfully complete the science questions at different parts of the scale for *Nature of Science*. The descriptions are provided in three broad bands along with examples from the assessment tasks. To develop the description each question was placed on the scale where the probability of answering it most fully was 70 percent. The demands of each question were examined and used to craft descriptions across the three bands. The descriptions for each band were organised around the four themes of the Nature of Science.



Scale description for Knowledge and Communication of Science Ideas

This scale provides a description of the *Knowledge and Communication of Science Ideas* scale. Each of the three bands describes the knowledge and competencies associated with that part of the scale along with examples from the assessment. To create the scale description, each item was placed on the scale where there was a 70 percent probability that the item would be answered correctly. Each item was then examined to identify the competencies required to be answered successfully. This allowed the science competence associated with different regions on the scale to be described.



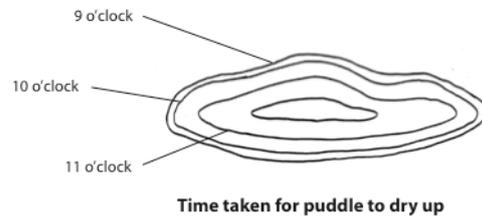
Teacher Questionnaire

A random sample of teachers answered a questionnaire to provide insight to teachers' experiences and attitudes regarding the teaching of science. Most teachers who responded to the questionnaire reported that they were responsible for teaching science to their class, although at Year 8 about a third of the teachers who responded were specialist science teachers. The majority of teachers at both Year 4 and Year 8 liked teaching science, however, fewer teachers at both year levels felt happy about their teaching or confident in their ability to teach science, particularly to a diverse group of students. This lack of confidence mirrored reports of somewhat low levels of professional support within schools and limited access to targeted professional development. This finding reflects that reported in TIMSS, and presents a less positive picture of professional confidence and support than was found for NMSSA writing in 2012.

Example of assessment for Knowledge and Communication of Science Ideas

9. Puddles

Room 4 noticed that puddles on the concrete get smaller when it stops raining. To find out how fast they go away, they drew around the edge of a puddle once every hour. Each time they did this they wrote down the time beside each drawing.



a) Finish their diagram by adding the time to the last drawing they did.

b) Explain how the puddle gets smaller.

Example of assessment task for Nature of Science

Float and Sink

SUPPLIES: container of water, paper towels
objects to float and sink: A (milk bottle top), B (steel washer), C (polystyrene cube), D (brass cube), E (foam circle with hole in middle)

Use the equipment A, B, C & D to find out about floating and sinking.

1. Record **five** things you found out.

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

2. Why do some things float and other things sink?

3. Think of some questions you could ask that would help you find out more about the idea of floating and sinking. Write down your **two** most interesting questions.

- 1) _____
- 2) _____

Teacher to give student object E.

4. Do you think object E will float or sink? (circle answer)

Float Sink Don't Know

5. Why do you think that? (teacher will record your answer)



Look at the photo of the boat.

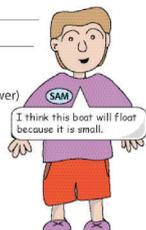
6. Why can this boat float? (teacher will record your answer)

This is Sam's idea about why a boat floats.

7. Do you agree or disagree with Sam's idea? (circle answer)

Agree Disagree Unsure

8. Why do you think that? (teacher will record your answer)



Full reports of Science 2012 and English: writing 2012 can be found at <http://nmssa.otago.ac.nz>

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