

Although national monitoring has been designed primarily to present an overall national picture of student achievement, there is some provision for reporting on performance differences among subgroups of the sample. Seven demographic variables are available for creating subgroups, with students divided into two or three subgroups on each variable, as detailed in Chapter 1 (p5).

The analyses of the relative performance of subgroups used an overall score for each task, created by adding scores for the most important components of the task.

Where only two subgroups were compared, differences in task performance between the two subgroups were checked for statistical significance using t-tests. Where three subgroups were compared, one way analysis of variance was used to check for statistically significant differences among the three subgroups.

Because the number of students included in each analysis was quite large (approximately 450), the statistical tests were quite sensitive to small differences. To reduce the likelihood of attention being drawn to unimportant differences, the critical level for statistical significance was set at $p = .01$ (so that differences this large or larger among the subgroups would not be expected by chance in more than one percent of cases). For team tasks, the critical level was raised to $p = .05$, because of the smaller sample size (120 teams, rather than about 450 students).

For the first four of the seven demographic variables, statistically significant differences among the subgroups were found for no more than 12 percent of the tasks at

both year 4 and year 8. For the remaining three variables, statistically significant differences were found on more than 12 percent of the tasks at one or both levels. In the report below, all “differences” mentioned are statistically significant (to save space, the words “statistically significant” are omitted).

Community Size

Results were compared for students living in communities containing over 100,000 people (main centres), communities containing 10,000 to 100,000 people (provincial cities), and communities containing less than 10,000 people (rural areas).

For year 4 students, there was a difference among the three subgroups on 1 of the 78 tasks. Students from rural areas scored lowest on *Multiplication Examples* (p14). There was also a difference on one question of the *Mathematics Survey* (p62): students from provincial cities were least positive and students from rural areas most positive on question 8 (how good their Mum or Dad thought they were at maths).

For year 8 students, there was a difference among the three subgroups on 1 of the 94 tasks. Students from provincial cities scored lowest on *Link Task 36* (p59). There were no differences on questions of the *Mathematics Survey*.

School Size

Results were compared from students in larger, medium size, and small schools (exact definitions were given in Chapter 1).

For year 4 students, there were differences among the three subgroups on 2 of the 78 tasks. Students attending small schools scored highest on *One Cut* (p46) and *Link Task 26* (p49). There was also a difference on one question of the *Mathematics Survey* (p62), with students from large schools most positive and students from small schools least positive on question 10 (how much they liked doing mathematics in their own time).

For year 8 students there were differences among the three subgroups on 2 of the 94 tasks. Students from small schools scored highest on *How Far?* (p58), and students from large schools scored highest on *Link Task 18* (p41). There were no differences on questions of the *Mathematics Survey*.

School Type

Results were compared for year 8 students attending full primary schools and year 8 students attending intermediate schools. Differences between the two subgroups were found on 2 of the 94 tasks. Students from full primary schools scored higher than did students from intermediate schools on *Lump Balance* (p31) and *Bank Account* (p36). There were no differences on questions of the *Mathematics Survey*.





Gender

Results achieved by male and female students were compared.

For year 4 students, there were differences between boys and girls on 9 of the 77 tasks.

Boys scored higher than girls on all 9 tasks: *Division Facts* (p13), *Speedo* (p17), *Number Items C* (p22), *Link Task 9* (p26), *Link Task 10* (p26), *Apples* (p29), *Measurement Items C* (p33), *Link Task 16* (p41), and *Link Task 17* (p41). There were no differences on questions of the *Mathematics Survey*.

For year 8 students, there were differences between boys and girls on 7 of the 93 tasks. Girls scored higher than boys on two tasks: *Addition Examples* (p14), and *Link Task 15* (p41). However, boys scored higher than girls on *Broken Ruler* (p38), *Link Task 14* (p41), *Link Task 18* (p41), *How Far?* (p58), and *Link Task 34* (p59). Boys were more positive than girls on one question of the *Mathematics Survey* (p62): how good their teacher thought they were at maths (question 4).

Zone

Results achieved by students from Auckland, the rest of the North Island, and the South Island were compared.

For year 4 students, there were differences among the three subgroups on 12 of the 78 tasks. Students from the South Island scored highest and students from Auckland scored lowest on 6 tasks: *Jack's Cows* (p18), *Link Task 9* (p26), *Lump Balance* (p31), *Link Task 17* (p41), *Farmyard Race* (p56), and *Link Task 31* (p59). Students from the South Island scored higher than the other two groups on 4 tasks: *Population [Y4]* (p24), and *Link Tasks 30, 33 and 34* (p59). Students from Auckland scored lowest and students from elsewhere in the North Island highest on two tasks: *One Cut* (p46) and *Link Task 26* (p49). There were also four differences on questions of the *Mathematics Survey* (p62). Students from Auckland were most positive and students from the South Island least positive on question 2 (how much they liked doing maths at school), question 1 (would they like to do more maths at school), question 9 (how they felt about doing maths they haven't tried before), and question 10 (how much they liked doing maths in their own time).

For year 8 students, there were differences among the three subgroups on 2 of the 94 tasks. Students from the North Island other than Auckland scored lowest on *Link Task 24* (p49) and *Link Task 33* (p59), with students from the South Island scoring highest on the latter task. There were no differences on questions of the *Mathematics Survey*.



Student Ethnicity

Results achieved by Māori and non-Māori students were compared.

For year 4 students, there were differences in performance on 58 of the 77 tasks. In each case, non-Māori students scored higher than Māori students. Because of the large number of tasks involved, they are not listed here. There was also a difference on one question of the *Mathematics Survey* (p62): Māori students were less positive than non-Māori students on question 3 (how good they thought they were at maths).

For year 8 students, there were differences in performance on 61 of the 93 tasks. In each case, non-Māori students scored higher than Māori students. Because of the large number of tasks involved, they are not listed here. There was also a difference on one question of the *Mathematics Survey* (p62): Māori students were more positive than non-Māori students on question 2 (how much they like doing maths at school).

Socio-Economic Index

Schools are categorised by the Ministry of Education based on census data for the census mesh blocks where children attending the schools live. The SES index takes into account household income levels, categories of employment, and the ethnic mix in the census mesh blocks. The SES index uses ten subdivisions, each containing ten percent of schools (deciles 1 to 10). For our purposes, the bottom three deciles (1-3) formed the low SES group, the middle four deciles (4-7) formed the medium SES group, and the top three deciles (8-10) formed the high SES group. Results were compared for students attending schools in each of these three SES groups.

For year 4 students, there were differences among the three subgroups on 68 of the 78 tasks. Because of the number of tasks involved, the specific tasks are not listed

here. In each case, performance was lowest for students in the low SES group. Students in the high SES group generally performed better than students in the medium SES group, but these differences often were smaller. There was also a difference on one question of the *Mathematics Survey* (p62), with students from low SES schools reporting greater enjoyment of doing maths at school (question 2).

For year 8 students, there were differences among the three subgroups on 71 of the 94 tasks. Because of the number of tasks involved, the specific tasks are not listed here. In each case, performance was lowest for students in the low SES group. In most cases, students in the high SES group also performed better than students in the medium SES group. On the *Mathematics Survey* (p62), there was a difference on one question. Students from low SES schools were least positive on question 5 (how good their mum or dad thought they were at maths).

Summary

Statistically significant differences of task performance among the subgroups based on school size, school type or community size occurred for very few tasks (at about the 1 percent level likely to occur by chance). There were differences among the three geographic zone subgroups on 15 percent of the tasks for year 4 students, but only 2 percent of the tasks for year 8 students. Boys performed better than girls on 12 percent of the year 4 tasks and 5 percent of the year 8 tasks, but girls performed better than boys on 2 percent of the year 8 tasks. Non-Māori students performed better than Māori students on 75 percent of the year 4 tasks and 66 percent for the year 8 tasks. The SES index based on school deciles showed the strongest pattern of differences, with differences on 87 percent of the year 4 tasks and 76 percent of the year 8 tasks.

The 2001 results for the Māori /Non-Māori and SES (school decile) comparisons are very similar to the corresponding 1997 results. In 1997 there were Māori /Non-Māori differences on 80 percent of year 4 tasks and 77 percent of year 8 tasks, and school decile differences on 85 percent of year 4 tasks and 77 percent of year 8 tasks. The most noticeable, although still relatively small, changes from the 1997 results involve the comparative performance of boys and girls. In 2001, year 4 boys performed better than girls on 12 percent of tasks (2 percent in 1997) and worse on none (4 percent in 1997). Year 8 boys performed better than girls on 5 percent of tasks (2 percent in 1997) and worse on 2 percent (14 percent in 1997).