3 Number and Algebra

Overview: Year 8 students performed substantially better than year 4 students on mathematics tasks involving number knowledge, strategies and skills, with an average of 30% more year 8 than year 4 students succeeding on the same number task components. On average, there was no meaningful change in number task performance between 2005 and 2009, for either year 4 or year 8 students. There was clear evidence of substantial change in the number task strategies that students use. These appeared to help with some tasks and hinder with others.

The assessments included 56 tasks investigating students' understandings, processes and skills in the areas of mathematics called number and algebra. Number includes the ways numbers are represented, their value, operations on number, accuracy and efficiency in calculating, estimating and making approximations. Algebra involves patterns and relationships in mathematics in the real world, the use of symbols, notation and graphs and diagrams to represent mathematical relationships and ideas, and the use of algebraic expressions for solving problems.

Twenty-six of the 56 tasks are trend tasks (fully described with data for both 2005 and 2009 – and for two tasks also from 2001). One is a longer-term trend task, with data from both 1997 and 2009. Three are released tasks (fully described with data for 2009 only) and 26 are link tasks (to be used again in 2010, so only partially described here). Trend tasks are presented first, then released tasks and finally link tasks.

There was major improvement in number and algebra knowledge and skills from year 4 to year 8. Averaged across 217 task components administered to both year 4 and year 8 students, 30% more

year 8 than year 4 students succeeded with these components. Year 8 students performed better on every component. As expected, the differences were generally larger on more difficult components – often components that many year 4 students would not yet have had much opportunity to learn in school or to practise.

Overall, performance at both year levels was unchanged between 2005 and 2009. Averaged across 137 trend task components attempted by year 4 students in both years, the same percentage of students succeeded in 2009 as in 2005. Gains occurred on 66 of the 137 components. At year 8 level also, on average, the same percentage succeeded in 2009 as in 2005. Gains occurred on 79 of the 172 trend task components. The most notable change in performance was a decline for year 8 students on multiplication problems (p36), where changes in computation strategy were clearly evident.

The first three tasks allowed exploration of trends over periods longer than four years. *Jumpers* (p13) showed substantial improvement from 1997 to 2009 for year 4 students and smaller improvement for year 8 students. *Number Facts (Multiplication)* (p14) and *Number Facts (Addition)* (p15) had data for 2001, 2005 and 2009. There was very little change on these tasks at both year levels between 2005 and 2009, after substantial losses for year 4 students on both tasks between 2001 and 2005 and a small loss for year 8 students on multiplication facts.

Students at both levels scored poorly in tasks involving estimation and tasks involving fractions (especially fractions other than halves and quarters). There was clear evidence that students have adopted changes in number strategy taught in recent years. This appears to have been advantageous in responses to some tasks and disadvantageous in responses to other tasks.

Trend Task: Jumpers
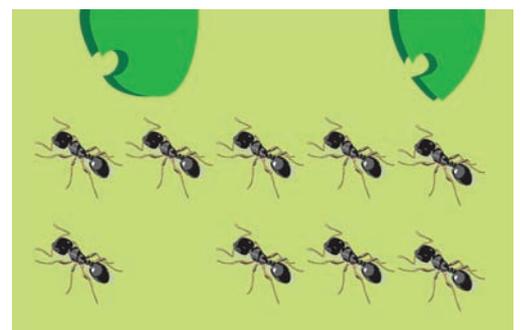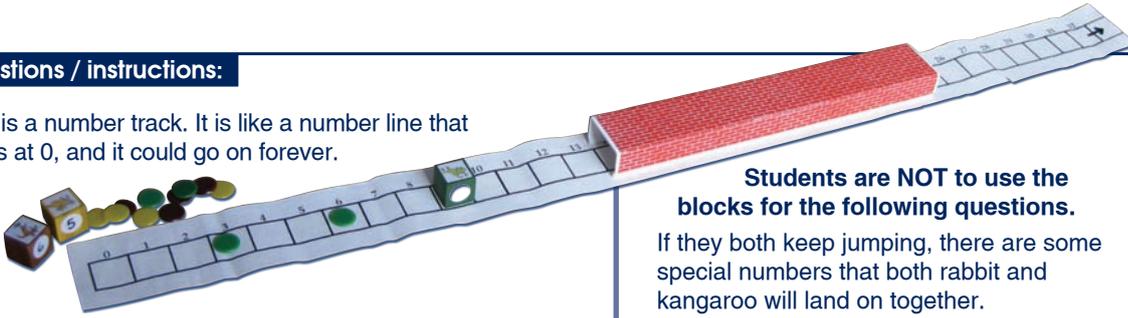
Approach:	One to one	**Year:** 4 & 8
Focus:	Number knowledge; patterns/sequences	
Resources:	Number line, recording book, frog, rabbit and kangaroo blocks, plastic coloured markers, tunnel	

Questions / instructions:

This is a number track. It is like a number line that starts at 0, and it could go on forever.

Set up number track and show animals.

This frog is a three-jumper. Starting at 0 it can jump three numbers at a time. It can make one jump and land on this number **(put on 3)** or two jumps and land on 6 **(place marker on 3 and place frog on 6)** or three jumps to 9 **(place marker on 6 and place frog on 9)**.

Linked to 1997
% response 2009 ('97)

		year 4	year 8
1. What is the next number the jumping frog would land on? Put a marker on the 9 then put the frog where you think it would land.	12	95 (94)	99 (100)

If student does not put the frog on 12, assist them with a correction explaining why it would be 12. Place the tunnel to cover the numbers 14 to 24.

Now I've put a tunnel over part of the number track.

		year 4	year 8
2. What is the next number the frog would land on – in the tunnel?	15	89 (88)	98 (96)
3. What is the first number it would land on when it came out of the tunnel?	27	43 (31)	76 (66)
4. Altogether, how many jumps from zero would the frog have made before it landed there?	9	22 (17)	60 (50)

Clear the number line to start again.

This rabbit is a 5 jumper, and the kangaroo is a 6 jumper.

Jump rabbit from 0 to 5 – place marker, then jump it onto 10 and leave it there. Jump kangaroo from 0 to 6 – place marker, then jump it onto 12 and leave it there.

Students are NOT to use the blocks for the following questions.

If they both keep jumping, there are some special numbers that both rabbit and kangaroo will land on together.

Linked to 1997
% response 2009 ('97)

		year 4	year 8
5. What is the **first** number that they would land on together?	30	31 (21)	80 (76)
6. How many jumps will rabbit have made to reach **(say the number given by student)**, starting from zero? *correct number of jumps (e.g. 6 jumps to reach 30)*		36 (21)	76 (71)
7. How many jumps will kangaroo have made to reach **(say the number given by student)**, starting from zero? *correct number of jumps (e.g. 5 jumps to reach 30)*		34 (20)	73 (70)

If they both keep on jumping, there is another number that both the rabbit and the kangaroo will land on that is the same number.

		year 4	year 8
8. What number do you think it will be?	60	21 (12)	71 (66)
9. How did you work that out? *not marked*		• (•)	• (•)

YEAR 8 ONLY:
Put all three animals on 30. Place the tunnel to cover the numbers 14 to 24.

If each animal started at 30 and made three jumps backward, only one animal would get right through the tunnel.
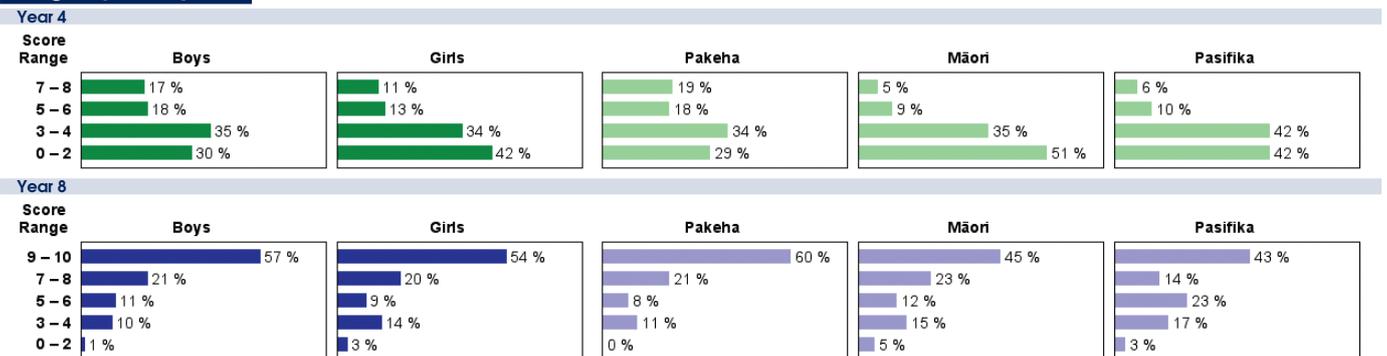
		year 4	year 8
10. Work out which animal that would be and tell me.	kangaroo		89 (90)
11. What number would that animal land on?	12		74 (70)

Total Score:		year 4	year 8
	9–10	• (•)	55 (43)
	7–8	14 (10)	21 (27)
	5–6	15 (8)	10 (16)
	3–4	35 (28)	12 (12)
	0–2	36 (54)	2 (2)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
7 – 8	17 %	11 %	19 %	5 %	6 %
5 – 6	18 %	13 %	18 %	9 %	10 %
3 – 4	35 %	34 %	34 %	35 %	42 %
0 – 2	30 %	42 %	29 %	51 %	42 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
9 – 10	57 %	54 %	60 %	45 %	43 %
7 – 8	21 %	20 %	21 %	23 %	14 %
5 – 6	11 %	9 %	8 %	12 %	23 %
3 – 4	10 %	14 %	11 %	15 %	17 %
0 – 2	1 %	3 %	0 %	5 %	3 %

Commentary:

This task was previously used in the 1997 assessments. The results show moderate improvements over the 12-year period both at the top and bottom for year 4 students and at the top for year 8 students. Year 4 boys scored significantly higher than year 4 girls.

Number Facts (Multiplication)

Approach:	Station
Focus:	Recall basic facts
Resources:	Computer program on laptop computer, answer booklet

Year: 4 & 8

Questions / instructions:
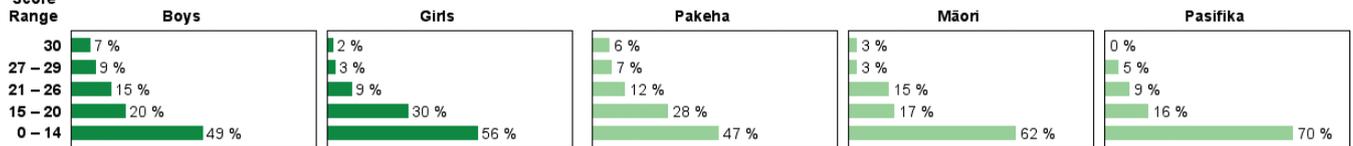
This activity uses the computer.
[Problems were presented on a computer screen, with sound track, at four-second intervals. Students responded in answer booklets that showed each problem and had a blank for entering the response.]

Linked to 2005 & 2001
% response
2009 ('05) ['01]

		year 4	year 8			year 4	year 8
4 × 7 =	28	34 (37) [47]	81 (82) [92]	4 × 8 =	32	22 (22) [30]	76 (78) [86]
9 × 1 =	9	79 (84) [85]	98 (98) [99]	0 × 1 =	0	64 (65) [68]	90 (94) [93]
3 × 9 =	27	38 (36) [55]	85 (88) [90]	9 × 2 =	18	67 (62) [70]	96 (95) [97]
6 × 4 =	24	29 (35) [45]	83 (83) [91]	7 × 5 =	35	45 (48) [61]	93 (90) [95]
9 × 8 =	72	23 (21) [28]	78 (77) [84]	3 × 6 =	18	35 (35) [52]	89 (87) [93]
0 × 7 =	0	69 (71) [73]	93 (94) [92]	5 × 2 =	10	75 (76) [80]	99 (96) [98]
8 × 7 =	56	15 (11) [20]	65 (65) [77]	8 × 6 =	48	11 (11) [19]	65 (66) [76]
3 × 5 =	15	70 (76) [77]	97 (97) [98]	2 × 1 =	2	80 (82) [84]	96 (96) [97]
6 × 9 =	54	21 (17) [26]	76 (76) [79]	7 × 0 =	0	70 (62) [65]	91 (89) [93]
2 × 4 =	8	78 (80) [81]	97 (96) [98]	9 × 9 =	81	34 (34) [36]	88 (87) [90]
8 × 8 =	64	17 (15) [22]	69 (69) [79]	9 × 3 =	27	32 (26) [45]	84 (84) [90]
5 × 5 =	25	71 (72) [78]	95 (95) [98]	1 × 6 =	6	80 (82) [82]	99 (98) [99]
0 × 0 =	0	95 (94) [92]	99 (99) [100]	4 × 4 =	16	39 (39) [57]	90 (87) [94]
7 × 3 =	21	42 (42) [55]	89 (89) [94]	1 × 8 =	8	78 (81) [83]	99 (98) [99]
6 × 7 =	42	16 (14) [24]	71 (73) [79]	9 × 4 =	36	24 (23) [37]	81 (81) [88]

Total Score:

	year 4	year 8
30	4 (2) [7]	37 (41) [47]
27–29	5 (7) [10]	29 (26) [30]
21–26	14 (14) [18]	20 (18) [15]
15–20	24 (23) [25]	8 (9) [5]
0–14	53 (54) [40]	6 (6) [3]

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
30	7 %	2 %	6 %	3 %	0 %
27 – 29	9 %	3 %	7 %	3 %	5 %
21 – 26	15 %	9 %	12 %	15 %	9 %
15 – 20	20 %	30 %	28 %	17 %	16 %
0 – 14	49 %	56 %	47 %	62 %	70 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
30	34 %	39 %	41 %	29 %	21 %
27 – 29	30 %	29 %	27 %	33 %	40 %
21 – 26	19 %	22 %	19 %	26 %	15 %
15 – 20	9 %	6 %	7 %	7 %	12 %
0 – 14	8 %	4 %	6 %	5 %	12 %

Commentary:

This task, focusing on knowledge of basic facts, was used previously in both 2001 and 2005. Both at year 4 and year 8 levels, there was very little change in performance from 2005 to 2009, which means that the drop in performance from 2001 to 2005 has been maintained in 2009. That drop is particularly evident where the multiplication involves digits other than 0, 1, 2 and 5. Year 4 boys scored significantly higher than year 4 girls, but there was a small opposite trend at year 8 level.

Number Facts (Addition)

Trend Task:

Approach:	Station	**Year:**	4 & 8
Focus:	Recall basic facts		
Resources:	Computer program on laptop computer, answer booklet		

Questions / instructions:

This activity uses the computer.
[Problems were presented on a computer screen, with sound track, at four-second intervals. Students responded in answer booklets that showed each problem and had a blank for entering the response.]

		Linked to 2005 & 2001 % response 2009 ('05) ['01]				Linked to 2005 & 2001 % response 2009 ('05) ['01]	
		year 4	year 8			year 4	year 8
3 + 6 =	9	88 (85) [91]	99 (99) [99]	9 + 9 =	18	83 (79) [88]	97 (98) [99]
4 + 2 =	6	91 (87) [93]	98 (96) [95]	6 + 6 =	12	92 (87) [94]	99 (98) [99]
5 + 7 =	12	71 (72) [85]	96 (94) [97]	5 + 9 =	14	67 (66) [88]	98 (97) [98]
3 + 0 =	3	93 (93) [93]	99 (98) [97]	7 + 6 =	13	57 (61) [88]	96 (95) [97]
8 + 9 =	17	65 (63) [83]	96 (95) [97]	8 + 3 =	11	82 (80) [93]	97 (97) [98]
0 + 5 =	5	89 (87) [87]	97 (95) [95]	0 + 4 =	4	90 (86) [87]	98 (95) [96]
4 + 6 =	10	82 (78) [89]	98 (98) [98]	6 + 9 =	15	60 (60) [85]	96 (96) [98]
6 + 8 =	14	57 (58) [84]	94 (95) [97]	8 + 0 =	8	93 (90) [94]	99 (98) [96]
2 + 6 =	8	85 (85) [93]	99 (99) [98]	8 + 5 =	13	70 (68) [87]	97 (96) [97]
7 + 8 =	15	57 (56) [81]	93 (93) [98]	4 + 3 =	7	80 (76) [93]	97 (97) [99]
1 + 7 =	8	91 (91) [93]	97 (98) [99]	8 + 4 =	12	72 (70) [90]	97 (98) [99]
0 + 6 =	6	89 (88) [86]	97 (95) [96]	3 + 9 =	12	78 (76) [90]	98 (98) [99]
9 + 7 =	16	63 (61) [85]	97 (96) [98]	7 + 4 =	11	67 (66) [89]	98 (96) [97]
2 + 8 =	10	88 (89) [92]	99 (98) [99]	4 + 9 =	13	65 (68) [88]	97 (97) [99]
5 + 4 =	9	85 (85) [91]	98 (97) [98]	3 + 7 =	10	75 (74) [91]	98 (98) [99]

Total Score:		year 4	year 8
	30	24 (22) [43]	64 (64) [68]
	29	12 (12) [19]	22 (22) [19]
	27–28	10 (11) [15]	8 (7) [9]
	24–26	9 (14) [7]	5 (4) [3]
	21–23	13 (7) [6]	0 (1) [0]
	15–20	19 (18) [3]	1 (1) [1]
	0–14	13 (16) [7]	0 (1) [0]

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
30	23 %	25 %	26 %	20 %	18 %
29	12 %	12 %	14 %	8 %	10 %
27 – 28	9 %	12 %	11 %	8 %	12 %
21 – 26	21 %	23 %	20 %	25 %	26 %
0 – 20	35 %	28 %	29 %	39 %	34 %

Year 8

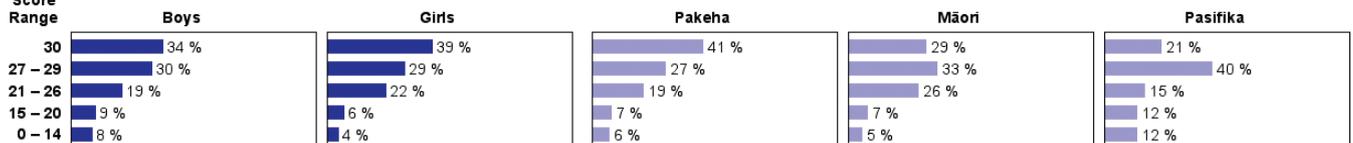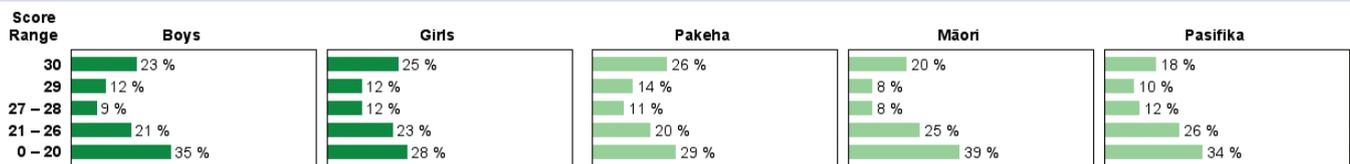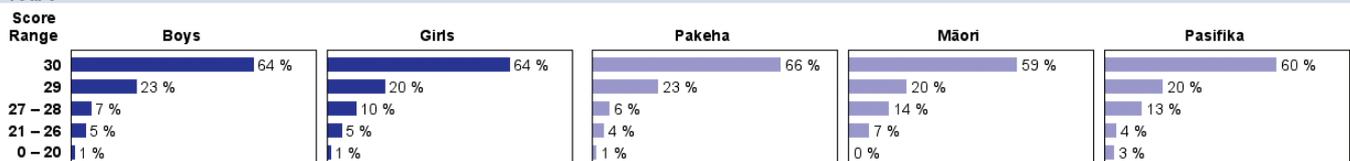| Score Range	Boys	Girls	Pakeha	Māori	Pasifika
30	64 %	64 %	66 %	59 %	60 %
29	23 %	20 %	23 %	20 %	20 %
27 – 28	7 %	10 %	6 %	14 %	13 %
21 – 26	5 %	5 %	4 %	7 %	4 %
0 – 20	1 %	1 %	1 %	0 %	3 %

Commentary:

This task, focusing on knowledge of basic facts, was used previously in both 2001 and 2005. Both at year 4 and year 8 level, there was very little change in performance from 2005 to 2009, which means that the marked drop in performance for year 4 students from 2001 to 2005 had been maintained in 2009. That drop is particularly evident where neither number added is 0, 1 or 2, and the sum is more than 12. Pasifika students performed similarly to Pakeha students at both year levels, as did year 8 Māori students.

Approach:	One to one	**Year:** 4 & 8
Focus:	Patterns; computation strategies	
Resources:	4 pictures [simulated resources shown below.]	

NEMP Access Task

Questions / instructions:

I'm going to show you some pictures of different objects.

Try to think of a quick way to work out how many objects there are without counting each one.

Here is the first page of objects.

Hand student picture 1. Allow time.

Questions / instructions	% response 2009 ('05) year 4	year 8
1. How many lizards are there? 15	87 (81)	95 (97)
2. How did you work out your answer?		
solution involved multiplication (5 × 3 or 3 × 5)	34 (35)	82 (83)
solution involving addition (5 + 5 + 5)	43 (39)	11 (12)
other sound approach not involving counting one by one	5 (9)	2 (0)
any other response, including counting one by one/counting in twos	18 (17)	5 (5)

Hand student picture 2. Allow time.

	year 4	year 8
3. Use a quick way for working out the number of ants. 22	53 (49)	75 (80)
4. How did you work out your answer?		
solution involving multiplication (5 × 2 + 3 × 4 or 5 × 5 – 3)	8 (14)	45 (51)
solution involving equivalent groupings (e.g. 9 + 9 + 4)	7 (8)	8 (8)
solution involving just addition (5 + 4 + 4 + 5 + 4)	34 (27)	21 (18)
other sound approach not involving counting one by one	10 (5)	5 (6)
any other response, including counting one by one/counting in twos	41 (46)	21 (17)

Hand student picture 3. Allow time.

	% response 2009 ('05) year 4	year 8
5. Use a quick way for working out the number of frogs. 16	63 (55)	74 (76)
6. How did you work out your answer?		
solution involving multiplication (4 × 4)	1 (1)	6 (8)
solution involving recognising top and bottom have equivalent groupings (e.g. 6 + 4 + 6; 2 + 4 + 6 + 4)	21 (23)	47 (46)
solution involving row by row addition (4 + 4 + 4 + 4 or 1 + 2 + 3 + 4 + 3 + 2 + 1)	29 (29)	20 (22)
other sound approach not involving counting one by one	10 (7)	7 (6)
any other response, including counting one by one/counting in twos	39 (40)	20 (17)
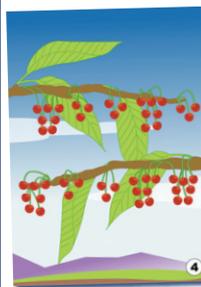
Hand student picture 4. Allow time.

	year 4	year 8
7. Use a quick way for working out the number of cherries. 50	29 (26)	52 (48)
8. How did you work out your answer?		
solution involving multiplication (7 × 5 + 5 × 3 or [3 + 7] × 5)	6 (8)	38 (36)
solution involving addition (of 5 tens or of 5 sevens and 5 threes)	21 (30)	18 (23)
other sound approach not involving counting one by one	21 (12)	18 (18)
any other response, including counting one by one/counting in twos	52 (50)	26 (23)

Total Score:	year 4	year 8
11–12	4 (0)	30 (28)
9–10	11 (16)	27 (33)
7–8	25 (18)	19 (19)
4–6	37 (44)	18 (16)
0–3	23 (22)	6 (4)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
11 – 12	5 %	4 %	6 %	0 %	2 %
9 – 10	10 %	10 %	10 %	7 %	15 %
7 – 8	26 %	25 %	28 %	19 %	21 %
4 – 6	34 %	40 %	33 %	43 %	49 %
0 – 3	25 %	21 %	23 %	31 %	13 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
11 – 12	33 %	27 %	32 %	26 %	22 %
9 – 10	25 %	29 %	30 %	15 %	27 %
7 – 8	22 %	16 %	20 %	23 %	17 %
4 – 6	14 %	22 %	13 %	26 %	27 %
0 – 3	6 %	6 %	5 %	10 %	7 %
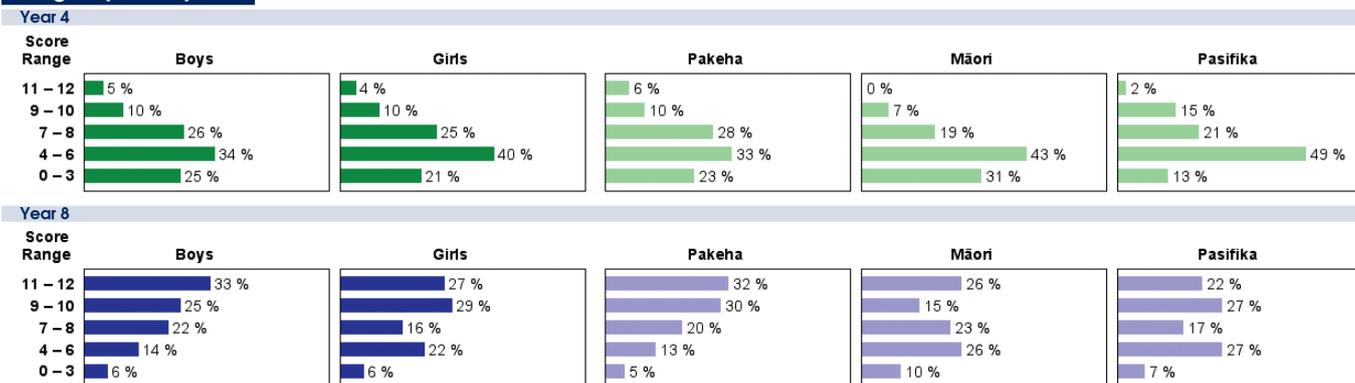
Commentary:

There was little change in performance at both year levels from 2005 to 2009. Year 4 Pasifika students performed similarly to Pakeha students.

Trend Task: Chocolate Fractions

NEMP Access Task

Approach:	One to one		Year:	4 & 8
Focus:	Calculating fractions using equipment			
Resources:	4 chocolate bars (divided into $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, whole), 5 fraction problem cards, photo			

Questions / instructions:

Arrange the four chocolate bars on the desk as shown in the photo.

Here are four chocolate bars. Use the chocolate bars to help answer some fraction problems. Here is the first problem. *[Cards identical to fractions in brackets.]*

Hand student card 1 and read it ($\frac{1}{2} + \frac{1}{2} =$).

		% response 2009 ('05)	
		year 4	year 8
1. What is the answer? Use the chocolate bars to explain your answer.	1	62 (63)	92 (93)
Explanation:			
clear and appropriate explanation		55 (48)	81 (84)
on right track but not clear/complete		7 (14)	8 (6)

Hand student card 2 and read it ($\frac{1}{2} + \frac{1}{4} =$).

		year 4	year 8
2. What is the answer? Use the chocolate bars to explain your answer.	$\frac{3}{4}$	22 (29)	57 (61)
Explanation:			
clear and appropriate explanation		17 (17)	47 (46)
on right track but not clear/complete		8 (10)	12 (15)

Hand student card 3 and read it ($1 - \frac{1}{3} =$).

		% response 2009 ('05)	
		year 4	year 8
3. What is the answer? Use the chocolate bars to explain your answer.	$\frac{2}{3}$	18 (22)	61 (59)
Explanation:			
clear and appropriate explanation		17 (14)	48 (45)
on right track but not clear/complete		4 (10)	12 (12)

YEAR 8 ONLY:

Hand student card 4 and read it ($1\frac{1}{4} - \frac{1}{2} =$).

		year 4	year 8
4. What is the answer? Use the chocolate bars to explain your answer.	$\frac{3}{4}$		55 (56)
Explanation:			
clear and appropriate explanation			44 (42)
on right track but not clear/complete			10 (11)

Hand student card 5 and read it ($2 \div \frac{1}{2} =$).

		year 4	year 8
5. What is the answer? You might want to use the chocolate bars to explain your answer.	4		25 (26)
Explanation:			
clear and appropriate explanation			17 (15)
on right track but not clear/complete			7 (6)

Y4 Total Score:		year 4	year 8
	3	12 (18)	
	2	15 (12)	
	1	37 (37)	
	0	36 (33)	
Y8 Total Score:	5		17 (18)
	4		30 (26)
	3		13 (17)
	2		13 (18)
	0–1		27 (21)

Subgroup Analyses:
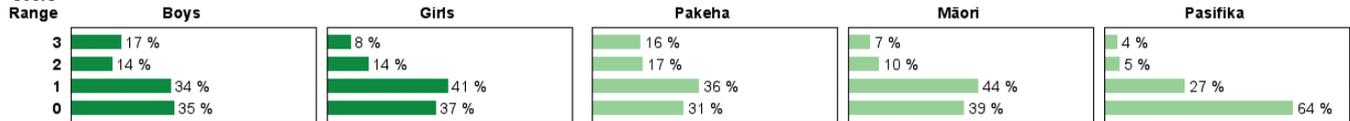
Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
3	17 %	8 %	16 %	7 %	4 %
2	14 %	14 %	17 %	10 %	5 %
1	34 %	41 %	36 %	44 %	27 %
0	35 %	37 %	31 %	39 %	64 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
5	21 %	14 %	22 %	9 %	3 %
4	30 %	30 %	34 %	19 %	23 %
3	10 %	16 %	12 %	16 %	13 %
2	14 %	11 %	10 %	17 %	29 %
0 – 1	25 %	29 %	22 %	39 %	32 %

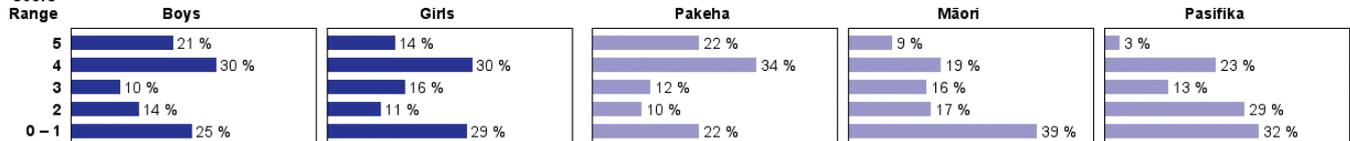### Commentary:

There was no meaningful change in performance from 2005 to 2009, at either year level. About two thirds of year 4 Pasifika students had no success with this task.

Trend Task: Division Facts

Approach:	Station
Focus:	Division facts
Resources:	Computer program on laptop computer, answer booklet

Year: 4 & 8

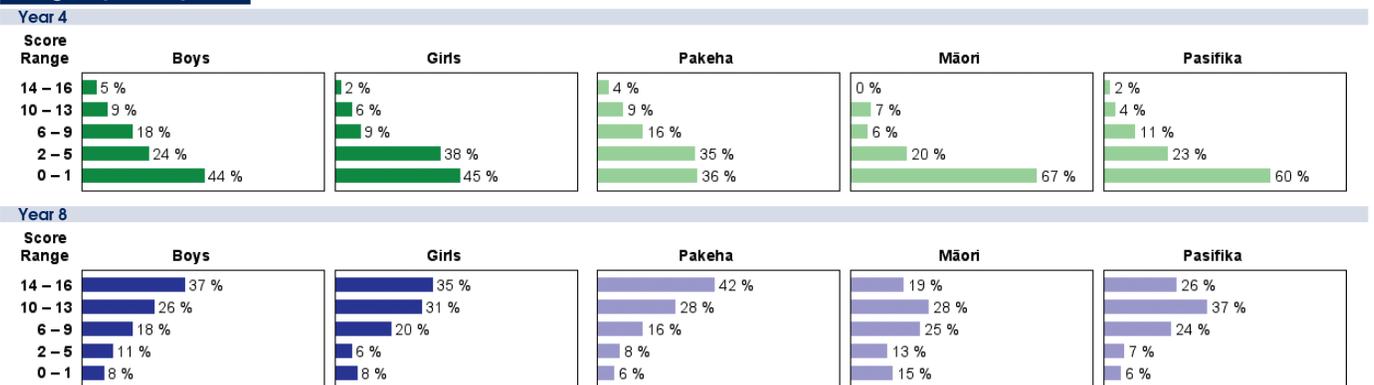### Questions / instructions:

This activity uses the computer.

[The problems were presented on the computer screen and soundtrack at eight-second intervals. The answer sheets did not show the problem again.]

If you cannot answer a question, put an "x" where you would write the answer.

	% response 2009 ('05) year 4	% response 2009 ('05) year 8
1. $36 \div 6 = \boxed{6}$	23 (17)	76 (78)
2. $27 \div 3 = \boxed{9}$	15 (15)	65 (69)
3. $4 \div 4 = \boxed{1}$	40 (41)	83 (89)
4. $36 \div 9 = \boxed{4}$	19 (17)	73 (78)
5. $12 \div 3 = \boxed{4}$	36 (34)	84 (87)
6. $54 \div 6 = \boxed{9}$	15 (11)	59 (63)
7. $8 \div \boxed{8} = 1$	38 (35)	81 (84)
8. $42 \div \boxed{6} = 7$	17 (10)	67 (70)
9. $10 \div \boxed{5} = 2$	36 (39)	81 (81)
10. $32 \div \boxed{4} = 8$	15 (15)	65 (67)
11. $50 \div \boxed{5} = 10$	45 (46)	83 (90)
12. $21 \div \boxed{3} = 7$	27 (25)	77 (81)
13. $\boxed{25} \div 5 = 5$	8 (9)	41 (45)
14. $\boxed{8} \div 4 = 2$	11 (9)	47 (55)
15. $\boxed{48} \div 6 = 8$	2 (1)	34 (39)
16. $\boxed{63} \div 9 = 7$	5 (2)	45 (48)

Total Score:	year 4	year 8
14–16	3 (1)	36 (42)
10–13	8 (8)	28 (26)
6–9	14 (12)	19 (17)
2–5	30 (35)	9 (12)
0–1	45 (44)	8 (3)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
14 – 16	5 %	2 %	4 %	0 %	2 %
10 – 13	9 %	6 %	9 %	7 %	4 %
6 – 9	18 %	9 %	16 %	6 %	11 %
2 – 5	24 %	38 %	35 %	20 %	23 %
0 – 1	44 %	45 %	36 %	67 %	60 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
14 – 16	37 %	35 %	42 %	19 %	26 %
10 – 13	26 %	31 %	28 %	28 %	37 %
6 – 9	18 %	20 %	16 %	25 %	24 %
2 – 5	11 %	6 %	8 %	13 %	7 %
0 – 1	8 %	8 %	6 %	15 %	6 %

Commentary:

This task focused on quick recall or derivation of basic division facts. Between 2005 and 2009 there was little change in performance for year 4 students and a small reduction for year 8 students. Year 8 Pasifika students performed similarly to Pakeha students.

Sprint Times

NEMP Access Task

Approach:	Station
Focus:	Placing time measurements in order
Resources:	5 stickers, answer booklet

Year: 4 & 8

Questions / instructions:

Five girls have just run a 100-metre race. The stopwatches show their finishing times in seconds.

Use the stickers to show their finishing times in order from slowest to fastest.

Āwhina — 16:38
Helen — 18:24
Kim — 16:02
Tuila — 15:59
Li-Ming — 16:20

Last				First
5th	4th	3rd	2nd	1st

	% response 2009 ('05)	
	year 4	**year 8**
Helen, Āwhina, Li-Ming, Kim, Tuila:		
all five in correct order	69 (75)	92 (91)
all five in reverse order	5 (3)	2 (2)
mostly correct	10 (10)	3 (5)

Total Score:		year 4	year 8
	3	69 (75)	92 (91)
	2	5 (3)	2 (2)
	1	10 (10)	3 (5)
	0	16 (12)	3 (2)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
3	73 %	64 %	75 %	62 %	45 %
2	4 %	6 %	5 %	4 %	7 %
1	11 %	10 %	9 %	14 %	9 %
0	12 %	20 %	11 %	20 %	39 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
3	92 %	92 %	91 %	95 %	88 %
2	1 %	4 %	4 %	0 %	6 %
1	3 %	1 %	1 %	3 %	3 %
0	4 %	3 %	4 %	2 %	3 %
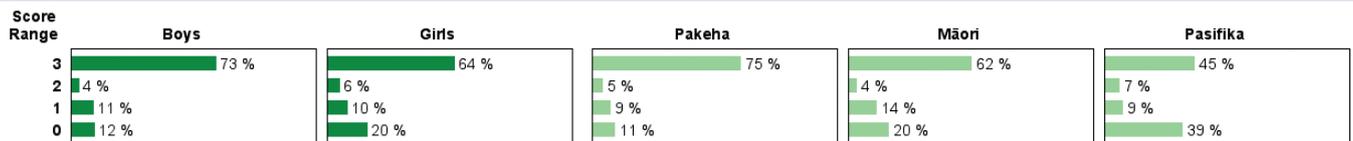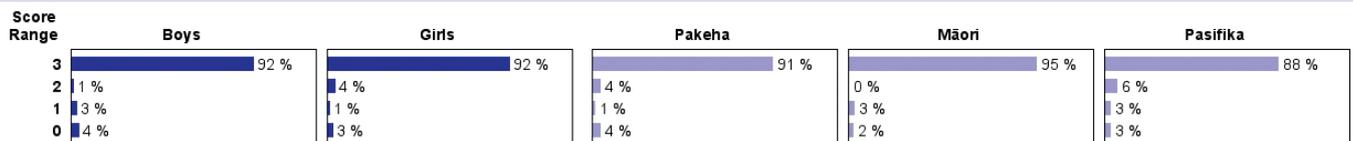
Commentary:

More than two thirds of students at both year levels succeeded fully with this task. There was little change at either year level between 2005 and 2009. At year 8 level, all subgroups performed similarly, but year 4 Pasifika students had markedly lower success than the other subgroups.

Trend Task: **Sheep**

		NEMP Access Task	**Year:** 4 & 8
Approach:	Station		
Focus:	Estimation		
Resources:	Picture, answer booklet		

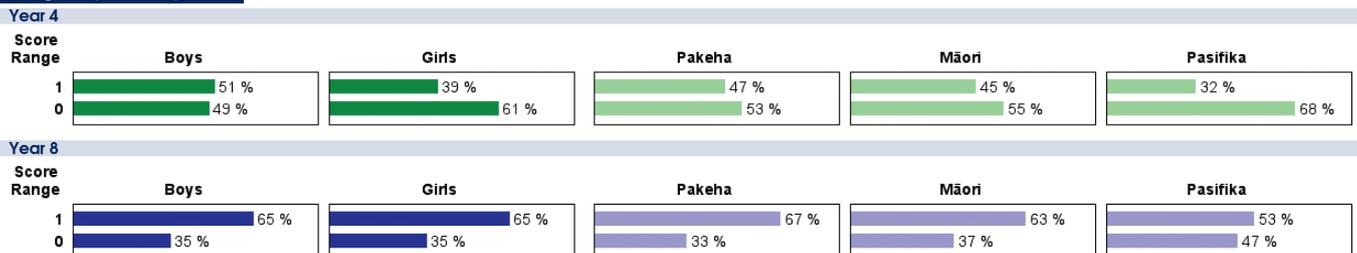### Questions / instructions:

Look at the picture of sheep in a paddock.

1. Which number do you think is nearest to the actual number of sheep? Circle your choice. *[Actual count: 810]*

		% response 2009 ('05)	
		year 4	**year 8**
a. 50 sheep		2 (3)	1 (0)
b. 500 sheep	B	45 (53)	65 (69)
c. 5000 sheep		52 (44)	32 (30)

Total Score:			
	1	45 (53)	65 (69)
	0	55 (47)	35 (31)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
1	51 %	39 %	47 %	45 %	32 %
0	49 %	61 %	53 %	55 %	68 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
1	65 %	65 %	67 %	63 %	53 %
0	35 %	35 %	33 %	37 %	47 %

Commentary:

Students showed quite limited skills at estimation, despite the large differences between the answer choices. Performance declined a little between 2005 and 2009. Māori and Pakeha students performed very similarly at both year levels.

Subtraction Facts

Approach:	Station	Year:	4 & 8
Focus:	Subtraction facts		
Resources:	Computer program on laptop computer, answer booklet		

Questions / instructions:

This activity uses the computer.
[The problems were presented on the computer screen and soundtrack at eight-second intervals. The answer sheets did not show the problem again.]
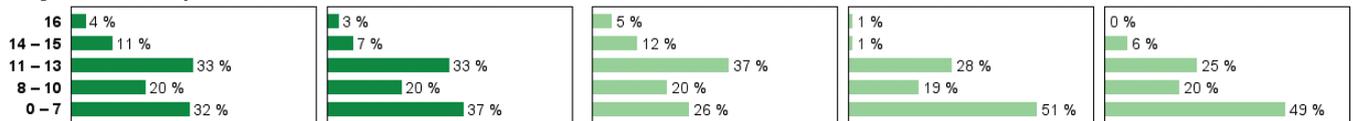If you cannot answer a question, put an "x" where you would write the answer.

		% response 2009 ('05) year 4	year 8
1.	$9 - 2 =$ **7**	71 (70)	96 (88)
2.	$15 - 6 =$ **9**	61 (62)	94 (89)
3.	$13 - 4 =$ **9**	67 (67)	96 (94)
4.	$7 - 0 =$ **7**	84 (86)	97 (94)
5.	$18 - 9 =$ **9**	68 (66)	98 (93)
6.	$12 - 6 =$ **6**	74 (78)	97 (96)
7.	$17 -$ **6** $= 11$	47 (47)	89 (86)
8.	$8 -$ **3** $= 5$	72 (70)	97 (94)
9.	$11 -$ **5** $= 6$	57 (58)	93 (91)
10.	$9 -$ **9** $= 0$	66 (61)	90 (88)
11.	$18 -$ **8** $= 10$	72 (71)	97 (95)
12.	**1** $- 0 = 1$	72 (68)	95 (93)
13.	**12** $- 5 = 7$	13 (14)	61 (60)
14.	**14** $- 4 = 10$	32 (33)	76 (76)
15.	**16** $- 8 = 8$	16 (20)	63 (65)
16.	**10** $- 7 = 3$	15 (20)	65 (67)

Total Score:		% response 2009 ('05) year 4	year 8
	16	4 (5)	38 (35)
	14–15	8 (10)	30 (30)
	11–13	34 (27)	23 (25)
	8–10	19 (24)	7 (6)
	0–7	35 (34)	2 (4)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
16	4 %	3 %	5 %	1 %	0 %
14 – 15	11 %	7 %	12 %	1 %	6 %
11 – 13	33 %	33 %	37 %	28 %	25 %
8 – 10	20 %	20 %	20 %	19 %	20 %
0 – 7	32 %	37 %	26 %	51 %	49 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
16	40 %	36 %	46 %	20 %	17 %
14 – 15	29 %	31 %	30 %	33 %	30 %
11 – 13	24 %	22 %	18 %	37 %	23 %
8 – 10	6 %	9 %	4 %	9 %	27 %
0 – 7	1 %	2 %	2 %	1 %	3 %

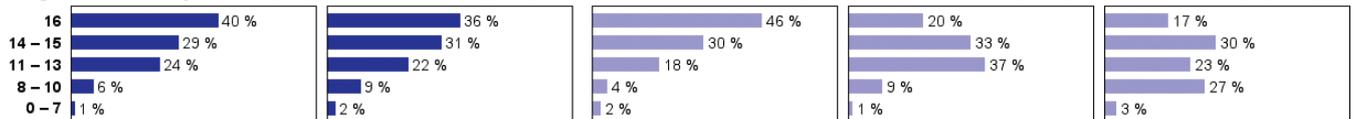## Commentary:

This task focused on quick recall or derivation of basic subtraction facts. At both year levels, there was little change in performance between 2005 and 2009. Finding the first number in a subtraction, with the answer given, proved particularly difficult. Year 4 Māori students and year 8 Pasifika students scored substantially lower than their Pakeha counterparts.

Trend Task: Population Change

|		
Approach:	Station	**Year:** 4 & 8
Focus:	Understanding place value	
Resources:	Computer program on laptop computer	

Questions / instructions:

This activity uses the computer.

Click on the button which says **Population Change**. The computer will tell you what to do.

VIDEO VOICEOVER:

You are going to order some numbers.

On the screen you will see numbers that show how many people live in some North Island towns.

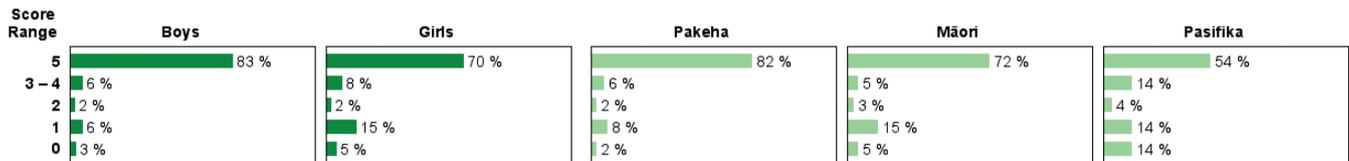Click and drag each town onto the table in order from the largest to the smallest number of people.
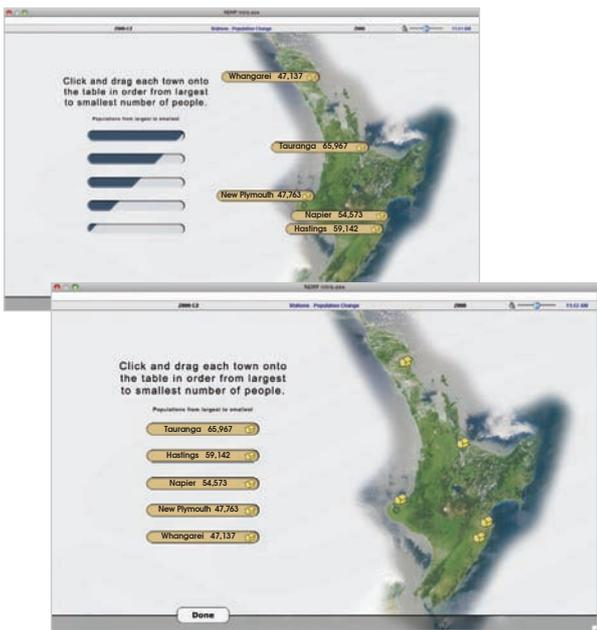
[Population figures based on 2005, as at time of task development.]

				% response 2009 ('05)	
				year 4	**year 8**
Ordered as:	1st	Tauranga	65,967	87 (80)	98 (95)
	2nd	Hastings	59,142	86 (69)	96 (93)
	3rd	Napier	54,573	81 (86)	96 (97)
	4th	New Plymouth	47,763	83 (69)	96 (94)
	5th	Whangarei	47,137	80 (75)	95 (94)
Total Score:	5			76 (64)	94 (92)
	3–4			7 (12)	2 (2)
	2			3 (3)	1 (1)
	1			10 (17)	2 (4)
	0			4 (4)	1 (1)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
5	83 %	70 %	82 %	72 %	54 %
3–4	6 %	8 %	6 %	5 %	14 %
2	2 %	2 %	2 %	3 %	4 %
1	6 %	15 %	8 %	15 %	14 %
0	3 %	5 %	2 %	5 %	14 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
5	96 %	92 %	97 %	88 %	86 %
3–4	1 %	2 %	1 %	3 %	0 %
2	2 %	1 %	0 %	3 %	3 %
1	1 %	4 %	2 %	5 %	7 %
0	0 %	1 %	0 %	1 %	4 %
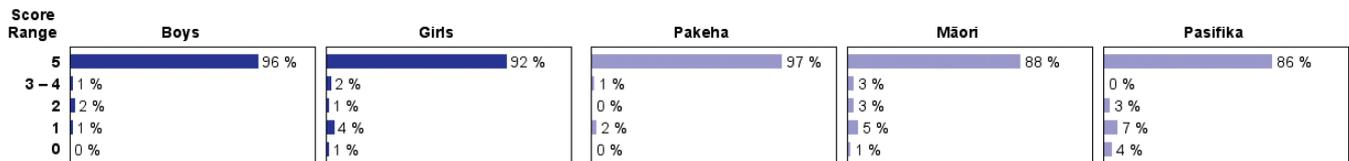
Commentary:

Placing the five towns in order by size proved easy for most students. Between 2005 and 2009 the performance of year 4 students improved a little, with no meaningful change for year 8 students. Year 4 boys scored significantly higher than year 4 girls.
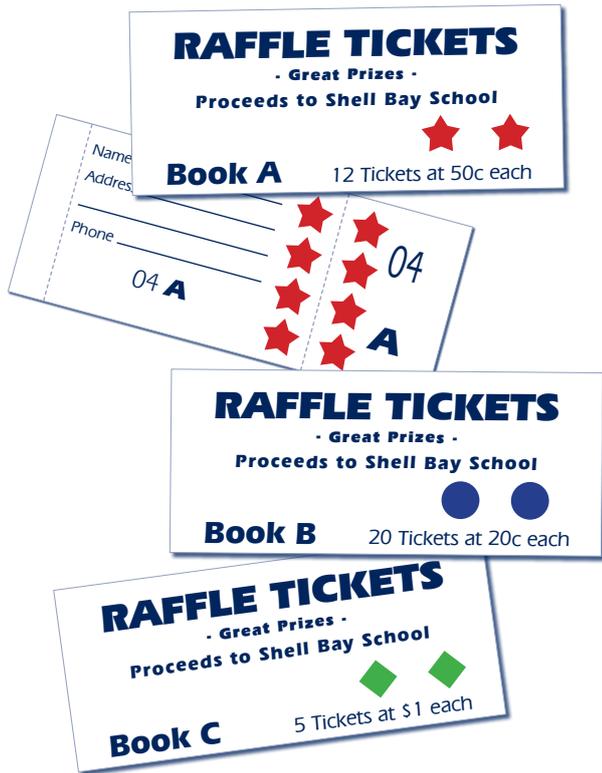
Raffle Tickets

NEMP Access Task

Approach:	Station
Focus:	Multiplication
Resources:	3 booklets of raffle tickets, answer booklet

Year: 4 & 8

Questions / instructions:

Look at the three booklets of raffle tickets.

Each booklet has a different number of tickets, and each booklet has a different ticket price.

RAFFLE TICKETS
- Great Prizes -
Proceeds to Shell Bay School

Book A   12 Tickets at 50c each

Name
Address
Phone
04 A
04 A

RAFFLE TICKETS
- Great Prizes -
Proceeds to Shell Bay School

Book B   20 Tickets at 20c each

RAFFLE TICKETS
- Great Prizes -
Proceeds to Shell Bay School

Book C   5 Tickets at $1 each

If each booklet of raffle tickets was sold, which booklet would make the **most** money?

Tick the best answer.

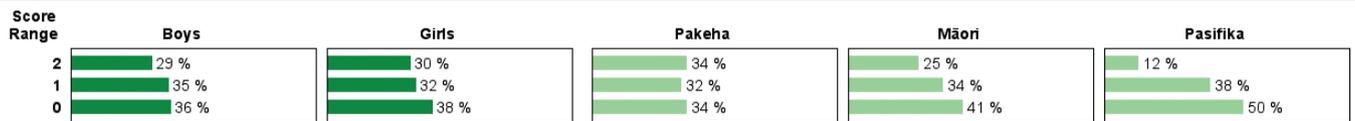|		% response 2009 ('05) year 4	year 8
Booklet A	✓	30 (33)	66 (74)
Booklet B	☐	33 (29)	16 (13)
Booklet C	☐	33 (37)	14 (8)

Total Score:	2	30 (33)	66 (74)
	1	33 (37)	14 (8)
	0	37 (30)	20 (18)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
2	29 %	30 %	34 %	25 %	12 %
1	35 %	32 %	32 %	34 %	38 %
0	36 %	38 %	34 %	41 %	50 %

Year 8

| Score Range	Boys	Girls	Pakeha	Māori	Pasifika
2	64 %	68 %	68 %	62 %	48 %
1	15 %	13 %	13 %	16 %	30 %
0	21 %	19 %	19 %	22 %	22 %
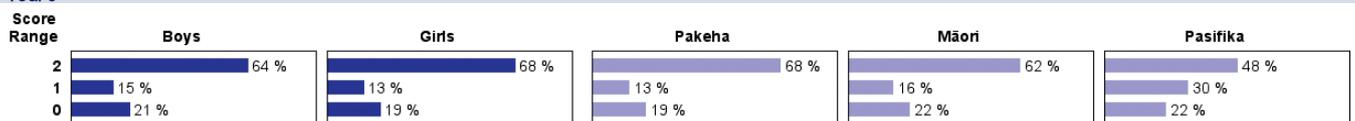
Commentary:

Solving this task involved multiplication or repeated addition of individual ticket costs for each booklet of tickets. Because almost equal percentages of year 4 students chose each option, there is very little evidence of this capability for year 4 students. Performance at both year levels was a little lower in 2009 than in 2005. At both year levels, Māori students performed similarly to Pakeha students.
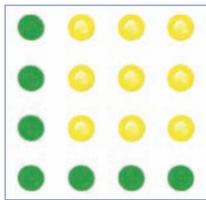
Trend Task: What Next?

NEMP Access Task

Approach:	Station	**Year:**	4 & 8
Focus:	Patterns and relationships		
Resources:	Picture, green and yellow pencils, answer booklet		

Questions / instructions:

Look at the picture.

It shows a pattern made with counters.
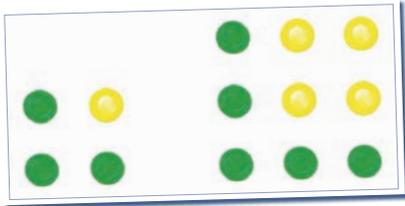
1. Use the green and yellow pencils to draw the next pattern – pattern number 3.

	% response 2009 ('05)	
	year 4	**year 8**
pattern drawn appropriately	25 (31)	53 (71)

YEAR 8 ONLY:

2. This table shows the pattern in numbers. Finish the table by filling in the missing numbers.

Pattern	Green	Yellow		% response 2009 ('05) year 8
1	3	1		
2	5	4		
3	*7*	*9*	both correct	43 (47)
			one correct	36 (36)
4	*9*	*16*	both correct	29 (30)
			one correct	46 (48)
5	*11*	*25*	both correct	23 (27)
			one correct	50 (48)
100	*201*	*10 000*	both correct	3 (5)
			one correct	5 (7)

Total Score:		year 8
	8–9	5 (9)
	6–7	21 (23)
	4–5	32 (33)
	2–3	20 (16)
	0–1	22 (19)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
1	27 %	22 %	30 %	12 %	18 %
0	73 %	78 %	70 %	88 %	82 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
8 – 9	5 %	4 %	6 %	3 %	0 %
6 – 7	21 %	21 %	26 %	10 %	4 %
4 – 5	32 %	33 %	32 %	33 %	28 %
2 – 3	22 %	19 %	20 %	20 %	29 %
0 – 1	20 %	23 %	16 %	34 %	39 %
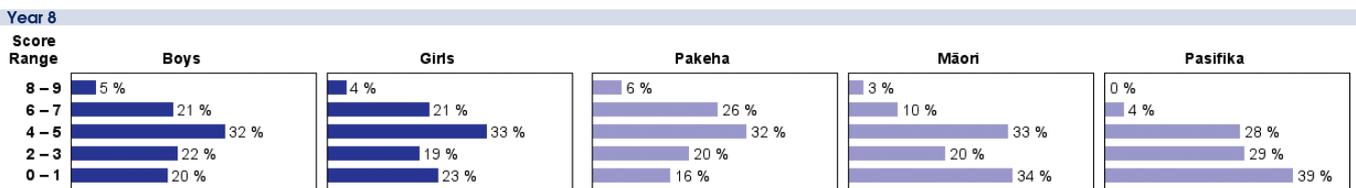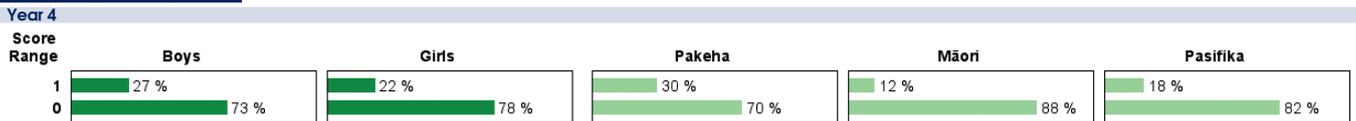
Commentary:

This task involved recognition and extrapolation of patterns. Very few year 8 students managed the final step of generalising the pattern to the 100th step. Performance dropped a little for both year 4 and year 8 students between 2005 and 2009. At year 8 level, Pasifika students were much less successful, on average, than Pakeha students.

Time Machine

Approach:	Independent		Year:	4 & 8
Focus:	Addition and subtraction; place value			
Resources:	Answer booklet			

Questions / instructions:

Imagine you have a time machine. You can travel in it from this year (2005) back to the past and forward to the future. The trip meter can be set to show you what year you will travel to.

% response 2009 ('05)

	year 4	year 8

1. Write what the trip meter will show if the time machine travels **two years into the future** from:

    `2 0 0 5`
    `2 0 0 7`   77 (76)   98 (95)

2. Write what the trip meter will show if the time machine travels **twenty years into the future** from:

    `2 0 0 5`
    `2 0 2 5`   57 (51)   94 (89)

3. Write what the trip meter will show if the time machine travels **two hundred years into the future** from:

    `2 0 0 5`
    `2 2 0 5`   32 (29)   85 (82)

YEAR 8 ONLY:

4. Write what the trip meter will show if the time machine travels **two thousand years into the future** from:

    `2 0 0 5`
    `4 0 0 5`   88 (81)

% response 2009 ('05)

	year 4	year 8

5. Write what the trip meter will show if the time machine travels **two years back to the past** from:

    `2 0 0 5`
    `2 0 0 3`   96 (92)

6. Write what the trip meter will show if the time machine travels **twenty years back to the past** from:

    `2 0 0 5`
    `1 9 8 5`   74 (69)

7. Write what the trip meter will show if the time machine travels **two hundred years back to the past** from:

    `2 0 0 5`
    `1 8 0 5`   64 (63)

8. Write what the trip meter will show if the time machine travels **two thousand years back to the past** from:

    `2 0 0 5`
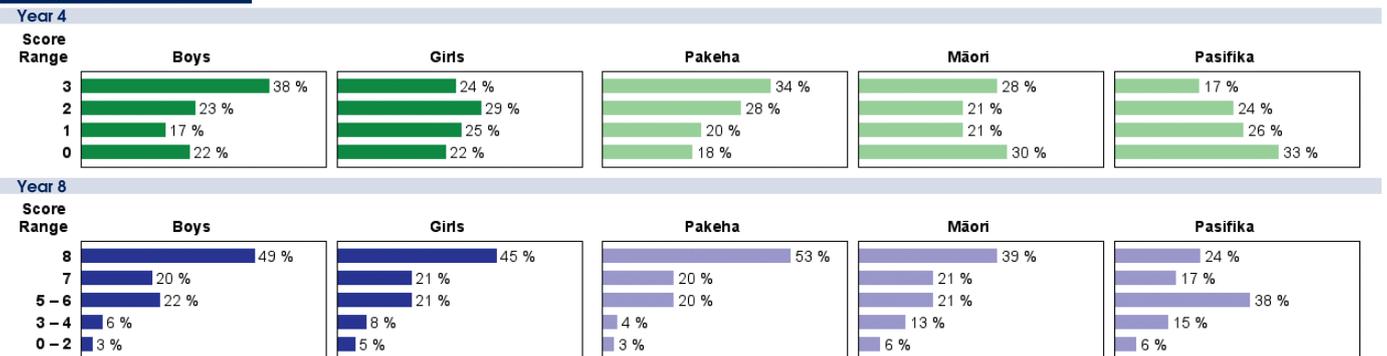   `0 0 0 5`   72 (66)

    (zeros were left out)

Y4 total score:		year 4
	3	31 (27)
	2	26 (24)
	1	21 (27)
	0	22 (22)

Y8 total score:		year 8
	8	47 (37)
	7	20 (25)
	5–6	22 (23)
	3–4	7 (8)
	0–2	4 (7)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
3	38 %	24 %	34 %	28 %	17 %
2	23 %	29 %	28 %	21 %	24 %
1	17 %	25 %	20 %	21 %	26 %
0	22 %	22 %	18 %	30 %	33 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
8	49 %	45 %	53 %	39 %	24 %
7	20 %	21 %	20 %	21 %	17 %
5 – 6	22 %	21 %	20 %	21 %	38 %
3 – 4	6 %	8 %	4 %	13 %	15 %
0 – 2	3 %	5 %	3 %	6 %	6 %

Commentary:

Between 2005 and 2009 there was a small improvement for year 8 students. Year 4 students were much less successful in changing the hundreds digit than the tens or ones digit.

Trend Task: Muffin Mix

Approach:	Independent	Year:	4 & 8
Focus:	Double and triple fractions and whole numbers		
Resources:	Answer booklet		

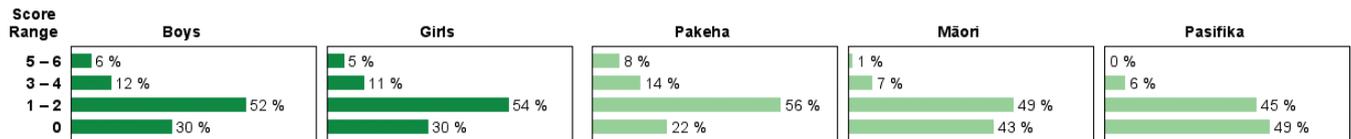### Questions / instructions:

This recipe makes 10 muffins.

For 10 Muffins:

2 eggs

$1\frac{1}{2}$ cups of self-raising flour

$\frac{3}{4}$ cup of milk

$\frac{1}{4}$ cup of sugar

$\frac{2}{3}$ cup of diced apple

75 grams of butter

% response 2009 ('05)

YEAR 4:

year 4

1. For each ingredient write down how much you would need to make **20** muffins.

	%
__4__ eggs	66 (69)
$\frac{1}{2}$ cup of sugar	14 (37)
__3__ cups of self-raising flour	13 (16)
$1\frac{1}{3}$ or $\frac{4}{3}$ cups of diced apple	11 (13)
$1\frac{1}{2}$ or $1\frac{2}{4}$ or $\frac{6}{4}$ cups of milk	10 (9)
__150__ grams of butter	26 (22)

Total Score:		
5–6	6 (7)
3–4	11 (17)
1–2	53 (48)
0	30 (28)

% response 2009 ('05)

YEAR 8:

year 8

1. For each ingredient write down how much you would need to make **30** muffins.

	%
__6__ eggs	88 (88)
$\frac{3}{4}$ cup of sugar	70 (66)
$4\frac{1}{2}$ cups of self-raising flour	60 (60)
__2__ cups of diced apple	39 (31)
$2\frac{1}{4}$ cups of milk	38 (32)
__225__ grams of butter	60 (62)

Total Score:		
6	21 (16)
4–5	32 (35)
2–3	29 (30)
0–1	18 (19)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
5 – 6	6 %	5 %	8 %	1 %	0 %
3 – 4	12 %	11 %	14 %	7 %	6 %
1 – 2	52 %	54 %	56 %	49 %	45 %
0	30 %	30 %	22 %	43 %	49 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
6	21 %	20 %	25 %	13 %	7 %
4 – 5	31 %	34 %	36 %	25 %	14 %
2 – 3	29 %	28 %	26 %	38 %	31 %
0 – 1	19 %	18 %	13 %	24 %	48 %

Commentary:

The tasks were different for year 4 and year 8 students, so their results cannot be compared directly. There was little change in performance from 2005 to 2009 at both year levels. Pasifika students averaged much lower than Pakeha students at year 8 level.

Fractious Fractions (Y4)

Approach:	One to one
Focus:	Fractions of an amount
Resources:	24 multilink blocks, 4 cards

Year: 4

Questions / instructions:

Hand students 24 multilink blocks and card 1. $\frac{1}{2}$

Here are 24 blocks.

	% response 2009 ('05) year 4

1. What is $\frac{1}{2}$ of 24? **12** 77 (79)

   Tell me how you worked this out.
   You can use the blocks if you want to.

Calculation strategy:		
$24 \div 2 = 12$	2 (4)
$2 \times 12 = 24$; $12 + 12 = 24$	22 (23)
2 equal groups with blocks, count 1 group	26 (23)
any other appropriate strategy	21 (30)

Hand student card 2. $\frac{1}{4}$

2. What is $\frac{1}{4}$ of 24? **6** 53 (54)

   Tell me how you worked this out.
   You can use the blocks if you want to.

Calculation strategy:		
$24 \div 4 = 6$	2 (2)
$4 \times 6 = 24$	4 (2)
4 equal groups with blocks, count 1 group	18 (12)
any other appropriate strategy	29 (37)

	% response 2009 ('05) year 4

Hand student card 3. $\frac{1}{3}$

3. What is $\frac{1}{3}$ of 24? **8** 36 (34)

   Tell me how you worked this out.
   You can use the blocks if you want to.

Calculation strategy:		
$24 \div 3 = 8$	2 (2)
$3 \times 8 = 24$	5 (5)
3 equal groups with blocks, count 1 group	22 (21)
any other appropriate strategy	5 (6)

Hand student card 4. $\frac{2}{3}$

4. What is $\frac{2}{3}$ of 24? **16** 16 (13)

   Tell me how you worked this out.
   You can use the blocks if you want to.

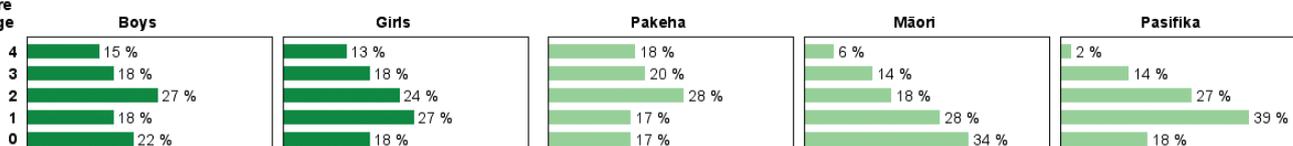 | **Calculation strategy:** | | |
   |---|---|---|
   | double question 3's answer | 9 (5) |
   | $24 \div 3 = 8$ and $2 \times 8 = 16$ | 1 (1) |
   | $3 \times 8 = 24$ and $2 \times 8 = 16$ | 1 (2) |
   | 3 equal groups with blocks, count 2 groups | 3 (3) |
   | any other appropriate strategy | 2 (4) |

Total Score:		
4	14 (12)
3	18 (18)
2	26 (27)
1	22 (26)
0	20 (17)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
4	15 %	13 %	18 %	6 %	2 %
3	18 %	18 %	20 %	14 %	14 %
2	27 %	24 %	28 %	18 %	27 %
1	18 %	27 %	17 %	28 %	39 %
0	22 %	18 %	17 %	34 %	18 %

Commentary:

Very few students used division as a strategy. There was no meaningful change in performance between 2005 and 2009.

Trend Task: Work It Out (Y4)

Approach:	One to one
Focus:	Computation strategies
Resources:	Card

Year: 4

$15 \times 4 = 60$
$16 \times 4 = \square$

Questions / instructions:

Hand card to student.

This card tells you that 15 times 4 is 60. Use this fact to work out 16 times 4.

	% response 2009 ('05) year 4
1. Tell me what you think the answer is. **64**	47 (51)

2. Now tell me how you worked it out.

PROMPT: *Can you explain that a bit more to me?*

	% response 2009 ('05) year 4
explanation showing understanding that the answer must be 4 more than 60	41 (39)
another valid strategy that made use of information that 15 × 4 = 60	6 (4)

	% response 2009 ('05) year 4
tried to directly calculate 16 × 4 *(i.e. did not make use of 15 × 4 = 60)*	6 (12)
any other response, including unclear explanation	47 (45)
Total Score: 4	40 (38)
3	3 (2)
2	9 (13)
1	3 (6)
0	45 (41)

Subgroup Analyses:

Year 4

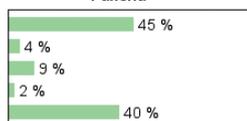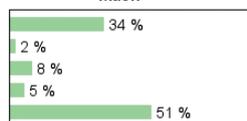| Score Range	Boys	Girls	Pakeha	Māori	Pasifika
4	43 %	37 %	45 %	34 %	23 %
3	3 %	3 %	4 %	2 %	2 %
2	13 %	4 %	9 %	8 %	3 %
1	3 %	3 %	2 %	5 %	4 %
0	38 %	53 %	40 %	51 %	68 %
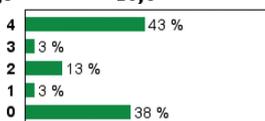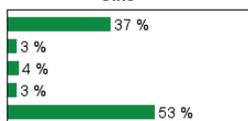
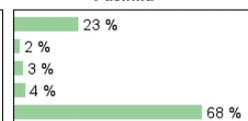### Commentary:

About half of the year 4 students used an efficient number strategy to attempt to solve this task. Fifteen percent more boys than girls adopted such a strategy.

Trend Task: Addition (Y4)

Approach:	Independent	**Year:** 4
Focus:	Adding without a calculator	
Resources:	Answer booklet	

Questions / instructions:

Work out the answers to the addition questions. Show how you work out your answers.

	% response 2009 ('05) year 4
1. 5 + 1 + 2 = 8 correct	96 (93)
incorrect with clear computational error	0 (1)
incorrect/any other response	4 (6)
Working used: horizontal algorithm	26 (34)
vertical algorithm	0 (2)
2. 2 + 6 + 8 = 16 correct	88 (88)
incorrect with clear computational error	1 (2)
incorrect/any other response	11 (10)
Working used: horizontal algorithm	26 (34)
vertical algorithm	0 (1)

	% response 2009 ('05) year 4
3. 4 + 2 + 9 + 5 + 3 = 23 correct	80 (75)
incorrect with clear computational error	2 (4)
incorrect/any other response	18 (21)
Working used: horizontal algorithm	24 (34)
vertical algorithm	0 (2)
4. 21 + 54 = 75 correct	75 (68)
incorrect with clear computational error	2 (2)
incorrect/any other response	23 (30)
Working used: horizontal algorithm	22 (27)
vertical algorithm	2 (5)
Total Score: 8	60 (54)
6–7	27 (28)
4–5	7 (11)
0–3	6 (7)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
8	59 %	61 %	63 %	46 %	64 %
6 – 7	26 %	28 %	25 %	38 %	20 %
4 – 5	6 %	8 %	7 %	5 %	9 %
0 – 3	9 %	3 %	5 %	11 %	7 %

Commentary:

Performance improved slightly from 2005 to 2009. Pasifika students performed very similarly to Pakeha students.

Multiplication (Y4)

		% response 2009 ('05) year 4
Approach:	Independent	**Year:** 4
Focus:	Multiplying without a calculator	
Resources:	Answer booklet	

Questions / instructions:

% response 2009 ('05) year 4

Work out the answers to the multiplication questions. Show how you work out your answers.

1. 6 × 7 = [42]   correct   44 (48)
     incorrect with clear computational error   4 (3)

    Working used: multiplication   8 (13)
      addition   5 (7)

2. 2 × 14 = [28]   correct   73 (71)
     incorrect with clear computational error   5 (2)

    Working used: multiplication   8 (11)
      addition   12 (12)

3. 22 × 3 = [66]   correct   36 (49)
     incorrect with clear computational error   5 (2)

    Working used: multiplication   9 (12)
      addition   9 (10)

4. 19 × 4 = [76]   correct   26 (28)
     incorrect with clear computational error   6 (3)

    Working used: multiplication   8 (11)
      addition   8 (9)

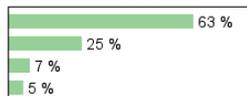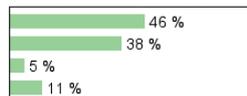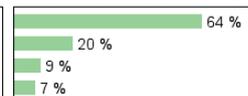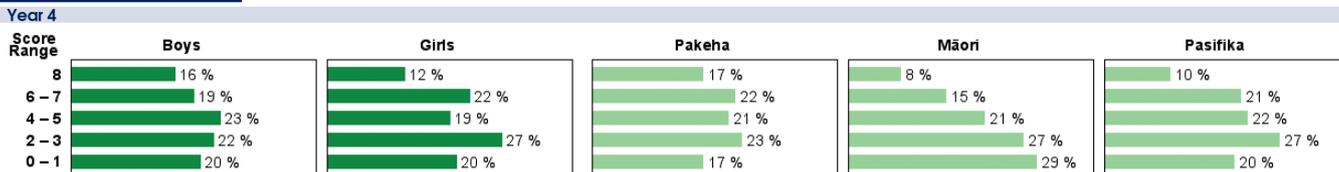| **Total Score:**		year 4
	8	14 (18)
	6–7	21 (22)
	4–5	21 (21)
	2–3	24 (18)
	0–1	20 (21)

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
8	16 %	12 %	17 %	8 %	10 %
6 – 7	19 %	22 %	22 %	15 %	21 %
4 – 5	23 %	19 %	21 %	21 %	22 %
2 – 3	22 %	27 %	23 %	27 %	27 %
0 – 1	20 %	20 %	17 %	29 %	20 %

Commentary:

Year 4 students averaged slightly lower on these multiplication tasks in 2009 than in 2005. Only one of the four multiplications (2 x 14) was completed successfully by more than 50% of the students.

Consecutive Numbers

NEMP Access Task

		% response 2009 ('05) year 8
Approach:	One to one	**Year:** 8
Focus:	Patterns, relationships, generalisations; verifying and proving	
Resources:	Card, calculator, recording book	

Questions / instructions:

% response 2009 ('05) year 8

Consecutive numbers are numbers that follow each other in order, like 1, 2, 3 or 9, 10, 11.

Hand student the *Consecutive Numbers* card.

Here is a card showing some sums with three consecutive numbers. Some people say that to add three consecutive numbers, you multiply the middle number by 3.

Hand out recording book, pencil, calculator.

> Some people say that to add three consecutive numbers, you multiply the middle number by 3.
>
> 9 + 10 + 11 = 30
> 19 + 20 + 21 = 60
> 99 + 100 + 101 = 300

1. Do you think this would always happen?   yes   73 (68)
      no   27 (32)

2. Explain to me why you think that.

    generalisation   10 (13)
(middle number is always 1 less than biggest number and 1 more than smallest number, so multiplying the middle number by 3 will always give the same result as adding all three numbers together)

    some explanation using one or more examples to justify   13 (11)

    some verification *(e.g. written/oral)* but not clear   36 (34)

    mathematical error justifying "no" as response to question 1   7 (15)

Total Score:		year 8
	4	10 (13)
	3	13 (11)
	2	36 (34)
	1	15 (11)
	0	26 (31)

Subgroup Analyses:

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
4	12 %	9 %	13 %	5 %	2 %
3	12 %	13 %	13 %	14 %	7 %
2	37 %	35 %	39 %	36 %	21 %
1	14 %	17 %	12 %	18 %	23 %
0	25 %	26 %	23 %	27 %	47 %
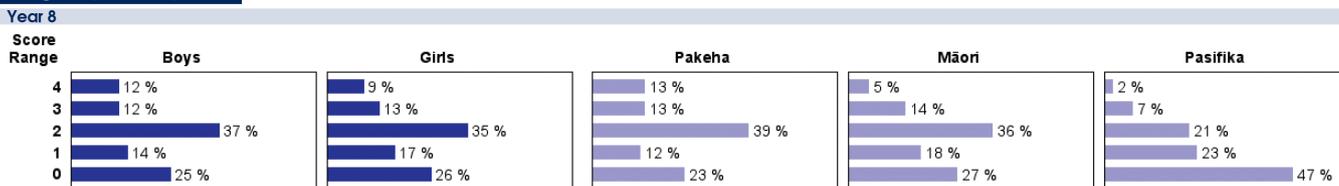
Commentary:

While about three quarters of the year 8 students agreed that the sum of three consecutive whole numbers will always be the same as three times the middle number, only about one quarter could clearly explain why they gave that answer. On average, Pasifika students scored substantially lower than Pakeha and Māori students.

Trend Task: Fractious Fractions (Y8)

NEMP Access Task

Approach:	One to one		**Year:**	8
Focus:	Fractions of an amount			
Resources:	24 multilink blocks, 4 cards			

Questions / instructions:

% response 2009 ('05)

Hand students 24 multilink blocks and card 1.

Here are 24 blocks.

$\frac{1}{4}$

year 8

1. What is $\frac{1}{4}$ of 24?   6   79 (85)

   Tell me how you worked this out.
   You can use the blocks if you want to.

   Calculation strategy: $24 \div 4 = 6$ 26 (28)
                           $4 \times 6 = 24$ 20 (21)
      4 equal groups with blocks, count 1 group   13 (16)
      any other appropriate strategy   20 (18)

Hand student card 2.

$\frac{2}{3}$

2. What is $\frac{2}{3}$ of 24?   16   56 (51)

   Tell me how you worked this out.
   You can use the blocks if you want to.

   Calculation strategy:
          $24 \div 3 = 8$ and $2 \times 8 = 16$ 24 (23)
          $3 \times 8 = 24$ and $2 \times 8 = 16$ 14 (8)
      3 equal groups with blocks, count 2 groups   14 (19)
      any other appropriate strategy   5 (3)

% response 2009 ('05)

Hand student card 3.

$\frac{5}{6}$

year 8

3. What is $\frac{5}{6}$ of 24?   20   56 (59)

   Tell me how you worked this out.
   You can use the blocks if you want to.

   Calculation strategy:
          $24 \div 6 = 4$ and $5 \times 4 = 20$ 22 (24)
          $6 \times 4 = 24$ and $5 \times 4 = 20$ 12 (8)
      6 equal groups with blocks, count 5 groups   17 (25)
      any other appropriate strategy   5 (5)

Remove the blocks from the student but leave them in sight. Hand student card 4.

$1\frac{1}{2}$

4. If you had to find $1\frac{1}{2}$ lots of these blocks, how many would you need?   36   53 (48)

   Tell me how you worked this out.
   You can use the blocks if you want to.

   Calculation strategy:
      $24 \div 2 = 12$ and $12 + 24 = 36$; OR
      $\frac{1}{2} \times 24 = 12$ and $12 + 24 = 36$ 46 (47)
      $2 \times 12 = 24$ and $12 + 24 = 36$ 1 (0)
      found $\frac{1}{2}$ of 24 blocks, added to 24   4 (0)
      any other appropriate strategy   4 (4)

                Total Score: 11–12   15 (11)
                            8–10   18 (23)
                            5–7   21 (19)
                            2–4   20 (27)
                            0–1   26 (20)

Subgroup Analyses:

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
11 – 12	15 %	16 %	20 %	5 %	3 %
8 – 10	18 %	18 %	22 %	10 %	5 %
5 – 7	19 %	22 %	21 %	23 %	19 %
2 – 4	24 %	17 %	19 %	20 %	27 %
0 – 1	24 %	27 %	18 %	42 %	46 %
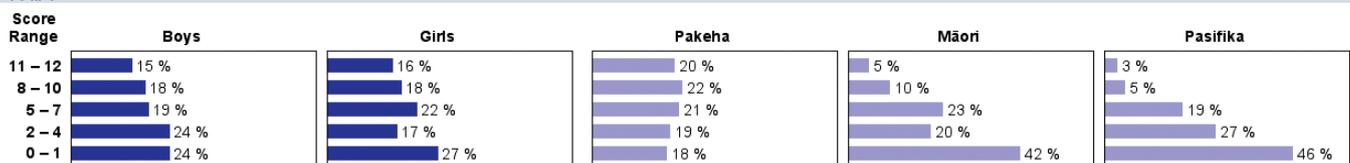
Commentary:

There was no meaningful change in performance from 2005 to 2009. Both Māori and Pasifika students averaged substantially lower than Pakeha students.

Work It Out (Y8)

Trend Task:

Approach:	One to one	Year:	8
Focus:	Computation strategies		
Resources:	Card		

Questions / instructions:

Hand card to student.

This card tells you that 54 times 6 is 324. Use this fact to work out 56 times 6.

% response 2009 ('05) — year 8

1. Tell me what you think the answer is.   **336**   70 (63)

2. Now tell me how you worked it out.
   PROMPT: *Can you explain that a bit more to me?*
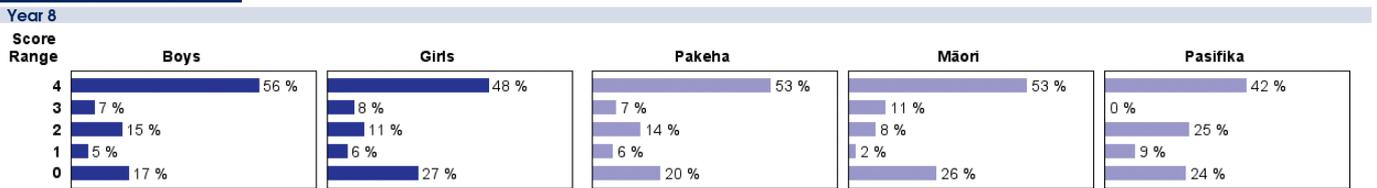
$54 \times 6 = 324$
$56 \times 6 = \boxed{}$

% response 2009 ('05) — year 8

	year 8
explanation show understanding that the answer must be 2 lots of six (12) more than 324	56 (42)
another valid strategy that made use of information that $54 \times 6 = 324$	5 (10)
tried to directly calculate 56×6 *(i.e. did not make use of $54 \times 6 = 324$)*	14 (18)
any other response, including unclear explanation	25 (30)

Total Score:	4	52 (39)
	3	8 (7)
	2	13 (20)
	1	5 (9)
	0	22 (25)

Subgroup Analyses:

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
4	56 %	48 %	53 %	53 %	42 %
3	7 %	8 %	7 %	11 %	0 %
2	15 %	11 %	14 %	8 %	25 %
1	5 %	6 %	6 %	2 %	9 %
0	17 %	27 %	20 %	26 %	24 %

Commentary:

Between 2005 and 2009, the percentage of year 8 students using an efficient number strategy to solve this task increased substantially, leading to a smaller rise in success with the task. Boys did a little better than girls, on average, with only small differences between Pakeha, Māori and Pasifika students.

Which is Bigger? (Y8)

Trend Task:

NEMP Access Task

Approach:	One to one	Year:	8
Focus:	Understanding fractions		
Resources:	3 fraction cards		

Questions / instructions:

I'm going to show you some cards with two fractions written on them. Try to work out which fraction is bigger and why.

% response 2009 ('05) — year 8

Hand student card 1. Read card to student. $\frac{3}{9}$ or $\frac{5}{9}$

1. Which fraction is bigger? $\frac{5}{9}$ 70 (72)
2. Why is that fraction bigger?

   $\frac{5}{9}$ has more ninths than $\frac{3}{9}$ 39 (38)

   any other valid reason   25 (23)

Hand student card 2. Read card to student. $\frac{3}{10}$ or $\frac{3}{8}$

% response 2009 ('05) — year 8

3. Which fraction is bigger? $\frac{3}{8}$ 75 (70)
4. Why is that fraction bigger?

   eighths are bigger than tenths   38 (27)

   any other valid response   25 (26)

Hand student card 3. Read card to student. $\frac{4}{5}$ or $\frac{3}{7}$

5. Which fraction is bigger? $\frac{4}{5}$ 75 (78)
6. Why is that fraction bigger?

   $\frac{4}{5}$ is almost a whole *(or more than half)* and $\frac{3}{7}$ is less than half   29 (18)

   any other valid response   28 (39)

Total Score:	8–9	30 (18)
	6–7	21 (24)
	4–5	15 (21)
	2–3	20 (24)
	0–1	14 (13)

Subgroup Analyses:

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
8 – 9	30 %	30 %	35 %	21 %	10 %
6 – 7	23 %	19 %	25 %	14 %	10 %
4 – 5	16 %	14 %	17 %	11 %	13 %
2 – 3	19 %	19 %	13 %	30 %	40 %
0 – 1	12 %	18 %	10 %	24 %	27 %
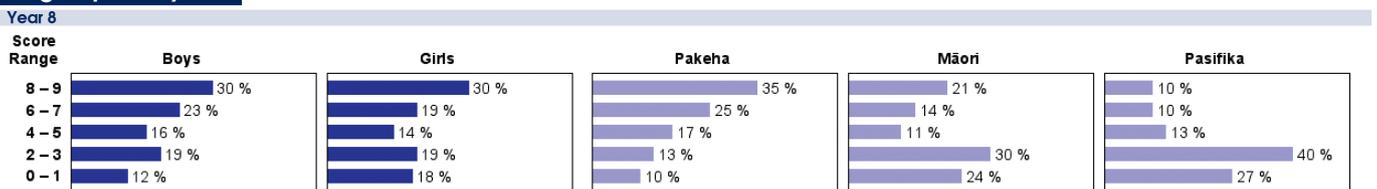
Commentary:

Students were no better in 2009 than in 2005 at choosing which fraction in each pair was bigger, but more 2009 students gave good explanations for a correct choice. On average, Pakeha students scored substantially higher than Māori and Pasifika students.

Trend Task: **Bridge**

NEMP Access Task

Approach:	Station	**Year:**	8
Focus:	Algebraic reasoning; patterns		
Resources:	16 iceblock sticks; answer booklet		

Questions / instructions:

This is a picture of a bridge.

With 3 sticks I can make this section of a bridge:

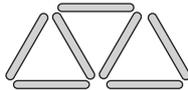With 7 sticks I can make 3 sections of a bridge:

% response 2009 ('05)
year 8

% response 2009 ('05)
year 8

1. Use the sticks to make 5 sections of a bridge. Draw it here.

5 sections shown	78 (71)
some sections shown	9 (11)

2. How many sticks would you need to make 11 sections of a bridge?　**23**　35 (45)

3. How did you work that out?

clear description of general strategy	36 (30)
vague description of general strategy	21 (24)
drew the picture and counted	20 (22)

4. How many sticks would you need to make 100 sections of a bridge?　**201**　12 (16)

5. How did you work that out?

clear description using equation	21 (17)
clear description using words	13 (16)
vague description of appropriate strategy	18 (20)

Total Score:		
	9–10	9 (11)
	7–8	18 (14)
	5–6	27 (28)
	3–4	24 (22)
	0–2	22 (25)

Subgroup Analyses:

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
9 – 10	7 %	10 %	11 %	4 %	0 %
7 – 8	16 %	22 %	20 %	19 %	13 %
5 – 6	27 %	26 %	26 %	25 %	31 %
3 – 4	23 %	26 %	21 %	33 %	31 %
0 – 2	27 %	16 %	22 %	19 %	25 %
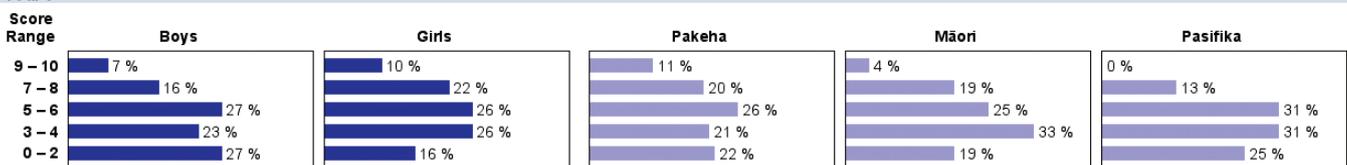
Commentary:

Performance on this task was very similar in 2005 and 2009. Girls scored significantly higher than boys. Differences between Pakeha, Māori and Pasifika students were quite small, on average, although few Pasifika students scored highly.

Trend Task: Tryathlon

NEMP Access Task

			Year:	8
Approach:	Station			
Focus:	Problem solving; computation			
Resources:	Stopwatch picture card; answer booklet			

Questions / instructions:

Matt did the Weet-Bix Tryathlon.
Look at how far he had to swim, run and ride.

Tryathlon Distances
- Swim 200 metres
- Run 1.5 kilometres
- Ride 8 kilometres

14821

Swim   Bike Ride   Run

05:27   19:32   08:06

	% response 2009 ('05)	
	year 4	year 8

1. The pool used for the tryathlon was 25 metres long. How many lengths did Matt have to swim?

8 — 61 (70)
4 — 8 (9)

2. The track used for the tryathlon was 500 metres long. How many laps of the track did Matt need to run?

3 — 62 (64)

3. Look at the times on the stopwatches. They show how long it took Matt to finish **each** part of the tryathlon.

How long did it take Matt to do the whole tryathlon?

33 mins 5 secs — 34 (30)
32 mins 65 secs — 28 (31)

Total Score:

	year 8
4	20 (22)
3	24 (23)
2	26 (25)
1	16 (19)
0	14 (11)

Subgroup Analyses:

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
4	24 %	16 %	23 %	15 %	11 %
3	26 %	21 %	25 %	24 %	7 %
2	24 %	27 %	27 %	20 %	32 %
1	13 %	20 %	15 %	18 %	25 %
0	13 %	16 %	10 %	23 %	25 %
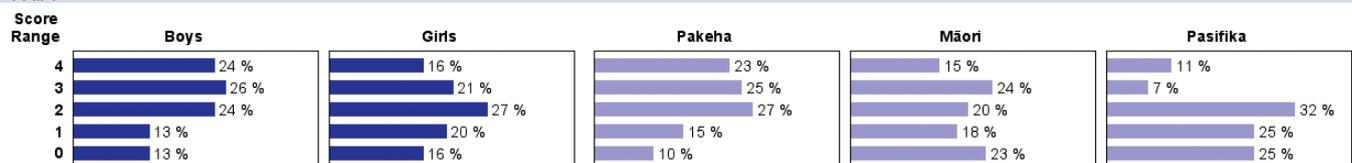
Commentary:

Performance on this task was very similar in 2005 and 2009. Boys scored significantly higher than girls.

Trend Task: Addition (Y8)

Approach:	Independent	**Year:**	8
Focus:	Adding without a calculator		
Resources:	Answer booklet		

Questions / instructions:

Work out the answers to the addition questions. Show how you work out your answers.

% response 2009 ('05) year 8

1. 4 + 2 + 9 + 5 + 3 = 23   correct — 90 (85)
    incorrect with clear computational error — 4 (5)
    incorrect/any other response — 6 (10)

    Working used: horizontal algorithm — 49 (44)
    vertical algorithm — 5 (13)

2. 21 + 54 = 75   correct — 95 (95)
    incorrect with clear computational error — 2 (1)
    incorrect/any other response — 3 (4)

    Working used: horizontal algorithm — 37 (23)
    vertical algorithm — 18 (32)

3. 76 + 48 = 124   correct — 82 (80)
    incorrect with clear computational error — 5 (5)
    incorrect/any other response — 13 (15)

    Working used: horizontal algorithm — 36 (22)
    vertical algorithm — 21 (35)

4. 389 + 217 = 606   correct — 77 (78)
    incorrect with clear computational error — 7 (5)
    incorrect/any other response — 16 (17)

    Working used: horizontal algorithm — 35 (20)
    vertical algorithm — 26 (40)

5. 49 + 103 + 51 + 97 + 260 = 560
    correct — 60 (62)
    incorrect with clear computational error — 15 (12)
    incorrect/any other response — 25 (26)

    Working used: horizontal algorithm — 39 (23)
    vertical algorithm — 25 (39)

% response 2009 ('05) year 8

Total Score:		
10	38 (43)
8–9	42 (34)
6–7	14 (13)
4–5	5 (6)
0–3	1 (4)

Subgroup Analyses:

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
10	38 %	37 %	39 %	30 %	43 %
8 – 9	42 %	43 %	41 %	44 %	47 %
6 – 7	12 %	15 %	15 %	12 %	10 %
4 – 5	7 %	3 %	3 %	13 %	0 %
0 – 3	1 %	2 %	2 %	1 %	0 %
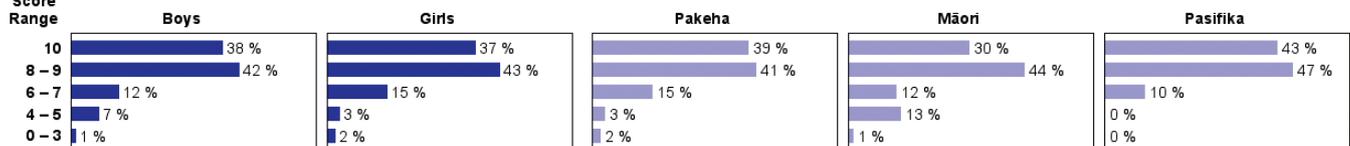
Commentary:

This task is notable for the high performance of Pasifika students. Overall, performance in 2009 is very similar to performance in 2005.

Pointless

Questions / instructions:

A boy used a calculator to work out some number problems.

There is something wrong with his calculator. It doesn't show the decimal point.

For each problem, put the decimal point where you think it should go. Make sure your decimal point is easy to read.
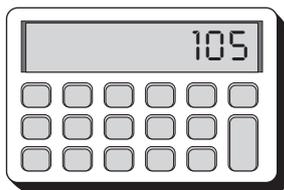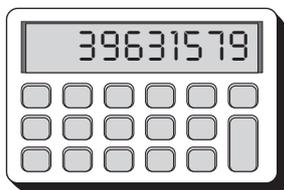
	% response 2009 ('05) year 8
52	
26 ÷ 5 = 5.2	89 (85)
105	
1.5 × 7 = 10.5	78 (74)
39631579	
753 ÷ 19 = 39.631579	39 (37)
414344	
211.4 × 196 = 41434.4	30 (30)
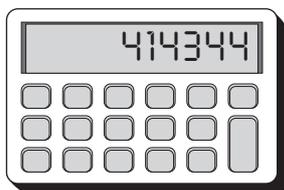
Total Score:		% response 2009 ('05) year 8
	4	17 (18)
	3	28 (23)
	2	36 (35)
	1	12 (15)
	0	7 (9)

Subgroup Analyses:

Year 8

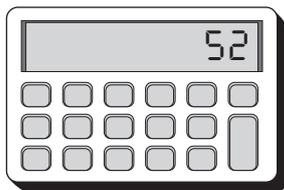| Score Range	Boys	Girls	Pakeha	Māori	Pasifika
4	17 %	17 %	20 %	11 %	3 %
3	27 %	30 %	32 %	21 %	14 %
2	38 %	33 %	34 %	36 %	55 %
1	12 %	12 %	10 %	21 %	4 %
0	6 %	8 %	4 %	11 %	24 %
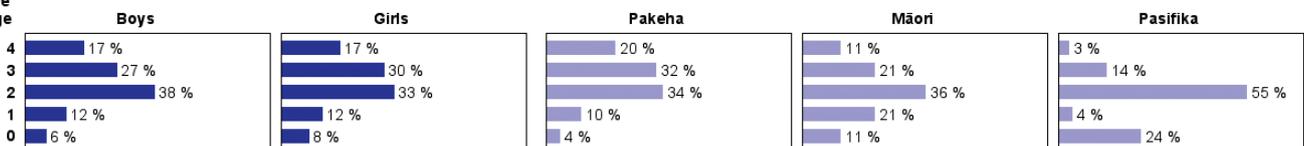
Commentary:

Overall, performance is very similar in 2005 and 2009. On average, Pasifika students scored substantially lower than Pakeha students. Estimation skills for computations involving larger numbers appear to be weak.

Trend Task: Multiplication (Y8)

Approach:	Independent	**Year:**	8
Focus:	Multiplying without a calculator		
Resources:	Answer booklet		

Questions / instructions:

Work out the answers to the multiplication questions. Show how you work out your answers.

% response 2009 ('05)
year 8

1. 22 × 3 = 66

correct		88 (93)
incorrect with clear computational error		2 (0)
Working used:	horizontal strategy	39 (22)
	vertical algorithm	17 (39)

2. 39 × 6 = 234

correct		56 (63)
incorrect with clear computational error		7 (4)
Working used:	horizontal strategy	37 (18)
	vertical algorithm	22 (48)

3. 4 × 421 = 1684

correct		64 (63)
incorrect with clear computational error		6 (7)
Working used:	horizontal strategy	36 (16)
	vertical algorithm	22 (50)

4. 596 × 2 = 1192

correct		64 (75)
incorrect with clear computational error		7 (6)
Working used:	horizontal strategy	33 (13)
	vertical algorithm	24 (54)

5. 5 × 2808 = 14040

correct		47 (61)
incorrect with clear computational error		8 (4)
Working used:	horizontal strategy	30 (11)
	vertical algorithm	24 (53)

% response 2009 ('05)
year 8

6. 59 × 32 = 1888

correct		25 (44)
incorrect with clear computational error		7 (11)
Working used:	horizontal strategy	23 (5)
	vertical algorithm	27 (57)

7. 64 × 4037 = 258368

correct		17 (30)
incorrect with clear computational error		7 (5)
Working used:	horizontal strategy	14 (4)
	vertical algorithm	29 (53)

Total Score:

12–14		24 (39)
9–11		23 (22)
6–8		21 (19)
3–5		14 (8)
0–2		18 (12)

Subgroup Analyses:

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
12 – 14	18 %	32 %	30 %	11 %	7 %
9 – 11	22 %	23 %	22 %	24 %	28 %
6 – 8	22 %	19 %	20 %	26 %	17 %
3 – 5	17 %	11 %	14 %	10 %	17 %
0 – 2	21 %	15 %	14 %	29 %	31 %
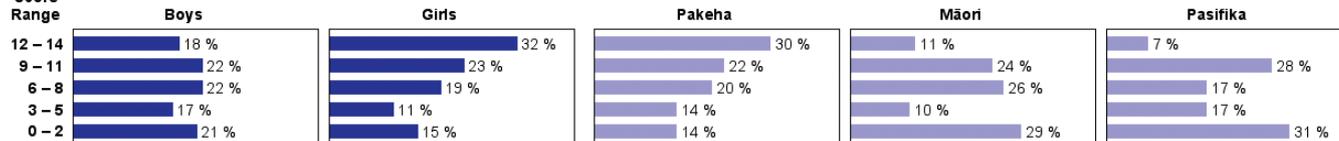
Commentary:

There has been a large decrease in performance between 2005 and 2009, particularly where computation involved carrying or where both numbers included two or more digits. Strategy explanations show major change from vertical (algorithmic) strategies to horizontal strategies. Girls scored significantly higher than boys.

Task:		Number Line Places

Approach:	Station		**Year:**	4 & 8
Focus:	Fractions, decimals, percentages			
Resources:	Computer program on laptop computer			

Questions / instructions:

% responses
y4   y8

This activity uses the computer.

Click on the button that says **Number Line Places**.
[Instructions given as voice-over as well as on screen.]

VOICE-OVER:
Click and drag the numbers onto the number line where you think they should go. When you are happy with where they are, click the 'Done' button.

	y4	y8
7 placed between 2 and 12	76	91
10 placed between 5 and 15	24	64
25 placed between 20 and 30	23	59
50 placed between 45 and 55	32	80
75 placed between 70 and 80	36	76

Y4 Total Score:		y4
	4–5	14
	3	17
	2	24
	1	29
	0	16

% responses
y4   y8

YEAR 8 ONLY:

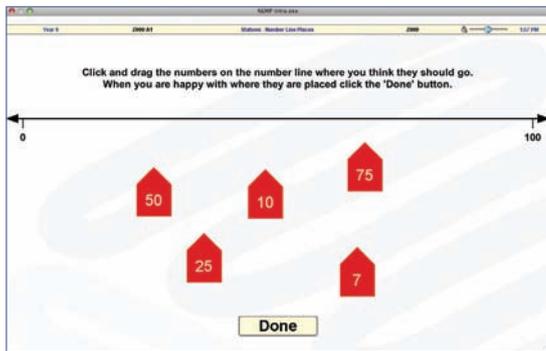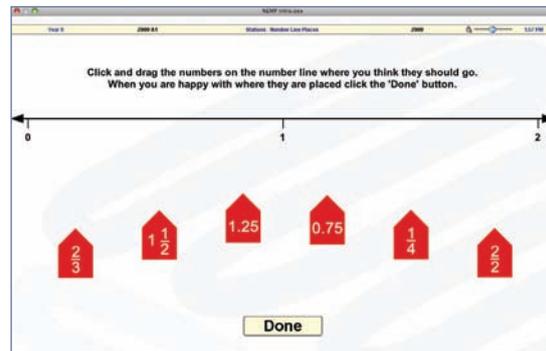|	y8
$\frac{1}{4}$ placed between 0.15 and 0.35	44
$\frac{2}{3}$ placed between 0.56 and 0.76	25
$\frac{3}{4}$ placed between 0.65 and 0.85	56
$\frac{2}{2}$ placed between 0.90 and 1.10	35
1.25 placed between 1.15 and 1.35	68
$1\frac{1}{2}$ placed between 1.40 and 1.60	75
$\frac{2}{3}$ placed before $\frac{3}{4}$	35

Y8 Total Score:		y8
	11–12	15
	9–10	20
	7–8	24
	5–6	17
	0–4	24

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
4 – 5	22 %	6 %	16 %	10 %	11 %
3	16 %	17 %	19 %	14 %	5 %
2	25 %	22 %	23 %	25 %	27 %
1	26 %	33 %	26 %	33 %	43 %
0	11 %	22 %	16 %	18 %	14 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
11 – 12	16 %	15 %	19 %	5 %	8 %
9 – 10	20 %	20 %	24 %	7 %	18 %
7 – 8	27 %	20 %	26 %	24 %	12 %
5 – 6	13 %	21 %	15 %	27 %	8 %
0 – 4	24 %	24 %	16 %	37 %	54 %
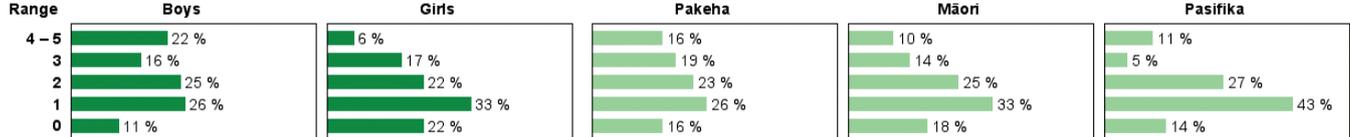
Commentary:

On average, year 8 students were much more successful than year 4 students in placing numbers appropriately on the 0 to 100 scale. Year 4 boys were significantly more successful than year 4 girls, but there was little difference at year 8 level, where Pakeha students were substantially more successful than Māori and Pasifika students.

Task: Fraction Problems

Approach:	Station	**Year:** 4 & 8
Focus:	Calculations with fractions	
Resources:	Answer booklet	

Questions / instructions:

1. Write your answers to the fraction problems in the boxes.

% responses

		y4	y8
a. $\frac{1}{2} + \frac{1}{2} =$ ☐	1	42	70
	$\frac{2}{2}$	6	5
	✗ $\frac{2}{4}$	15	12
b. $3 + \frac{1}{4} =$ ☐	$3\frac{1}{4}$	19	63
c. $\frac{1}{4} + \frac{2}{4} =$ ☐	$\frac{3}{4}$	30	70
	✗ $\frac{3}{8}$	22	14
d. $1 - \frac{1}{2} =$ ☐	$\frac{1}{2}$	26	62
e. $\frac{3}{4} - \frac{1}{4} =$ ☐	$\frac{1}{2}$	7	18
	$\frac{2}{4}$	23	48
f. $\frac{3}{4} + \frac{3}{4} =$ ☐	$1\frac{1}{2}$	7	25
	$1\frac{2}{4}$	5	17
	$\frac{6}{4}$	11	9
	✗ $\frac{6}{8}$	26	20

YEAR 8 ONLY:

		y4	y8
g. $2 \div \frac{1}{4} =$ ☐	8		19
	✗ $\frac{1}{2}$ or $\frac{2}{4}$		18
h. $\frac{1}{4} \times \frac{1}{2} =$ ☐	$\frac{1}{8}$		24
	✗ $\frac{1}{4}$		3
i. $1\frac{1}{3} \div \frac{1}{3} =$ ☐	4		19
	✗ $\frac{4}{3}$		4
j. $\frac{1}{4} \div 2 =$ ☐	$\frac{1}{8}$		19
	✗ $\frac{1}{2}$		10

% responses

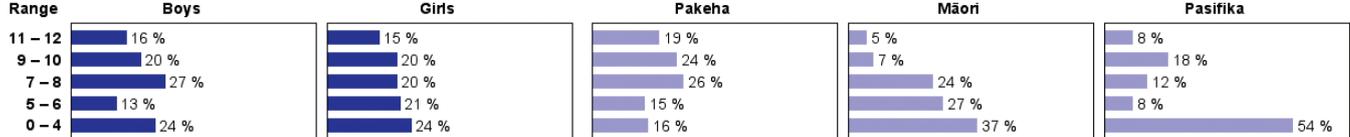|		y4	y8
Y4 Total Score:	7–9	8	
	5–6	13	
	3–4	17	
	1–2	24	
	0	38	
Y8 Total Score:	11–13		8
	8–10		25
	5–7		30
	2–4		21
	0–1		16

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
7 – 9	9 %	8 %	12 %	2 %	0 %
5 – 6	13 %	12 %	17 %	5 %	2 %
3 – 4	14 %	19 %	18 %	16 %	14 %
1 – 2	25 %	24 %	22 %	33 %	22 %
0	39 %	37 %	31 %	44 %	62 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
11 – 13	6 %	9 %	10 %	1 %	7 %
8 – 10	25 %	26 %	29 %	15 %	14 %
5 – 7	31 %	30 %	33 %	28 %	18 %
2 – 4	23 %	19 %	14 %	37 %	36 %
0 – 1	15 %	16 %	14 %	19 %	25 %
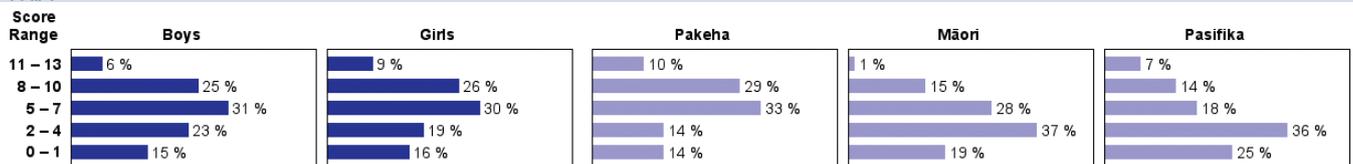
Commentary:

All except the first component proved very difficult for year 4 students, with less than 30% succeeding with each component. The additional components for year 8 students also had low success rates.

Task: Less Than

Approach:	Independent
Focus:	Place and total value
Resources:	Answer booklet

Year: 4 & 8

Questions / instructions:

				% responses y4	% responses y8
What is 1 less than:	a)	16	15	92	94
	b)	330	329	78	93
Year 4 only:	c)	999	998	83	
Year 8 only:	c)	1.7	0.7		50
What is 10 less than:	d)	184	174	66	91
	e)	1655	1645	59	88
What is 100 less than:	f)	327	227	69	90
	g)	1023	923	40	76
	h)	1225	1125	52	88
What is 1000 less than:	i)	3459	2459	59	87
	j)	27492	26492	39	81
YEAR 8 ONLY:					
What is .01 less than:	k)	3.25	3.24		76
	l)	10.1	10.09		22
	m)	20.99	20.98		78

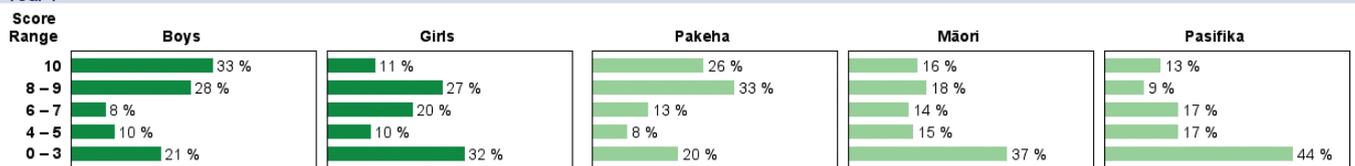|		% responses y4	% responses y8
Y4 Total Score:	10	22	
	8–9	27	
	6–7	14	
	4–5	11	
	0–3	26	
Y8 Total Score:	13	13	
	11–12		49
	8–10		26
	4–7		6
	0–3		6

Subgroup Analyses:

Year 4

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
10	33 %	11 %	26 %	16 %	13 %
8 – 9	28 %	27 %	33 %	18 %	9 %
6 – 7	8 %	20 %	13 %	14 %	17 %
4 – 5	10 %	10 %	8 %	15 %	17 %
0 – 3	21 %	32 %	20 %	37 %	44 %

Year 8

Score Range	Boys	Girls	Pakeha	Māori	Pasifika
13	15 %	11 %	17 %	6 %	3 %
11 – 12	49 %	49 %	51 %	46 %	41 %
8 – 10	24 %	29 %	23 %	30 %	35 %
4 – 7	6 %	4 %	5 %	6 %	9 %
0 – 3	6 %	7 %	4 %	12 %	12 %
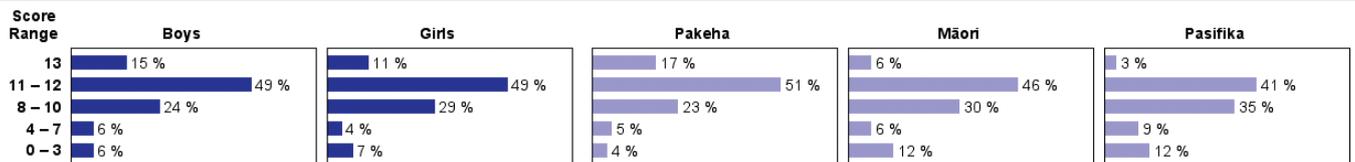
Commentary:

Students at both year levels enjoyed quite good success with this task, except when subtracting 1000 from 27,492 at year 4 level or .01 from 10.1 at year 8 level. Year 4 boys scored significantly higher than year 4 girls and many year 4 Māori and Pasifika students found the task difficult.

		% responses	
		y4	**y8**

LINK TASK: 1

Approach:	One to one
Year:	4 & 8
Focus:	Solving word problems

Total Score:		y4	y8
	5	–	28
	4	–	15
	3	6	22
	2	33	18
	1	13	8
	0	48	9

LINK TASK: 2

Approach:	One to one
Year:	4 & 8
Focus:	Number knowledge

Total Score:		y4	y8
	5–6	6	40
	3–4	19	25
	1–2	38	23
	0	37	12

LINK TASK: 3

Approach:	One to one
Year:	4 & 8
Focus:	Place value; addition and subtraction using Dean's blocks

Y4 Total Score:		y4	y8
	9	64	
	7–8	12	
	5–6	9	
	0–4	15	
Y8 Total Score:	13		40
	12		17
	11		26
	0–10		17

LINK TASK: 4

Approach:	One to one
Year:	4 & 8
Focus:	Recording numbers; place and total value

Total Score:		y4	y8
	9	12	63
	8	14	17
	6–7	36	14
	0–5	38	6

LINK TASK: 5

Approach:	Station
Year:	4 & 8
Focus:	Number knowledge; computation strategy

Y4 Total Score:		y4	y8
	19–24	11	
	13–18	24	
	7–12	18	
	1–6	9	
	0	38	
Y8 Total Score:	29–36		12
	21–28		26
	11–20		26
	1–10		14
	0		22

LINK TASK: 6

Approach:	Station
Year:	4 & 8
Focus:	Fractions; number strategy

Y4 Total Score:		y4	y8
	2	40	
	1	31	
	0	29	
Y8 Total Score:	3		53
	2		29
	1		12
	0		6

LINK TASK: 7

Approach:	Independent
Year:	4 & 8
Focus:	Dividing without a calculator

Y4 Total Score:		y4	y8
	5–6	10	
	3–4	43	
	1–2	13	
	0	34	
Y8 Total Score:	9–10		15
	7–8		17
	5–6		21
	3–4		41
	0–2		6

LINK TASK: 8

Approach:	Independent
Year:	4 & 8
Focus:	Subtraction calculation

Y4 Total Score:		y4	y8
	5	15	
	3–4	30	
	2	18	
	0–1	37	
Y8 Total Score:	9		19
	7–8		33
	5–6		19
	3–4		16
	0–2		13

	% responses y4	y8

LINK TASK: 9

Approach:	Station
Year:	4 & 8
Focus:	Calculations with word problem fractions

Y4 Total Score:		y4	y8
	8–10	12	
	6–7	14	
	4–5	24	
	2–3	21	
	0–1	29	
Y8 Total Score:	13–14		17
	11–12		24
	8–10		28
	5–7		19
	0–4		12

LINK TASK: 10

Approach:	Independent
Year:	4 & 8
Focus:	Equivalence

Total Score:		y4	y8
	6	7	42
	4–5	10	23
	2–3	17	13
	1	41	14
	0	25	8

LINK TASK: 11

Approach:	Independent
Year:	4 & 8
Focus:	Place value

Total Score:		y4	y8
	10	20	57
	9	24	29
	7–8	23	8
	5–6	14	2
	0–4	19	4

LINK TASK: 12

Approach:	One to one
Year:	4
Focus:	Place and total value

Total Score:		y4
	4	15
	3	19
	2	14
	1	7
	0	45

LINK TASK: 13

Approach:	Station
Year:	4
Focus:	Patterns; using algebraic reasoning

Total Score:		y4
	3	27
	2	25
	1	33
	0	15

LINK TASK: 14

Approach:	Independent
Year:	4
Focus:	Identifying forwards and backwards counting patterns

Total Score:		y4	y8
	12	29	
	10–11	19	
	8–9	21	
	5–7	11	
	0–4	20	

LINK TASK: 15

Approach:	Independent
Year:	4
Focus:	Solving problems using a mix of operations

Total Score:		y4
	4	21
	3	20
	2	16
	1	16
	0	27

LINK TASK: 16

Approach:	Independent
Year:	4
Focus:	Place and total value

Total Score:		y4
	10	25
	8–9	26
	6–7	13
	4–5	12
	0–3	24

LINK TASK: 17

Approach:	One to one
Year:	8
Focus:	Place and total value

Total Score:		y4	y8
	6		35
	5		17
	4		24
	3		13
	0–2		11

LINK TASK: 18

Approach:	One to one
Year:	8
Focus:	Number strategy

Total Score:		y4	y8
	4		17
	3		30
	2		28
	1		21
	0		4

% responses y8

LINK TASK: 19

Approach:	Station
Year:	8
Focus:	Patterns; using algebraic reasoning

Total Score:	6–7	5
	4–5	25
	2–3	55
	0–1	15

LINK TASK: 20

Approach:	Independent
Year:	8
Focus:	Converting fractions, decimals and percentages

Total Score:	11–12	14
	8–10	19
	5–7	21
	2–4	23
	0–1	23

LINK TASK: 21

Approach:	Independent
Year:	8
Focus:	Identifying forwards and backwards counting patterns

Total Score:	15	35
	12–14	28
	9–11	18
	6–8	13
	0–5	6

LINK TASK: 22

Approach:	Independent
Year:	8
Focus:	Solving problems using a mix of operations

Total Score:	6–7	11
	4–5	26
	2–3	30
	0–1	33

% responses y8

LINK TASK: 23

Approach:	Independent
Year:	8
Focus:	Place and total value

Total Score:	13	16
	11–12	39
	9–10	29
	7–8	8
	0–6	8

LINK TASK: 24

Approach:	Independent
Year:	8
Focus:	Equivalence; inverse operations

Total Score:	9–10	20
	6–8	16
	4–5	19
	2–3	18
	0–1	27

LINK TASK: 25

Approach:	Independent
Year:	8
Focus:	Fractions; solving problems

Total Score:	6	22
	4–5	21
	2–3	40
	0–1	17

LINK TASK: 26

Approach:	Independent
Year:	8
Focus:	Identifying numbers, especially decimals, on a number line

Total Score:	7	22
	5–6	28
	3–4	34
	0–2	16