

INTERPRETATION OF GRAPHS, TABLES AND MAPS

Twenty-five of the assessment tasks presented students with completed graphs, tables or maps and asked them to extract and interpret particular information.

Thirteen of these tasks were completely or largely the same for year 4 and year 8 students. Of these thirteen tasks, four tasks are link tasks (to be used again in 1999), and nine are released tasks (fully described here). Nine other tasks, including four link tasks, were attempted only by year 8 students. The remaining three tasks, including two link tasks, were attempted only by year 4 students.

The tasks were presented to students in two formats. Tasks which involved more complex instructions or required more extended responses were administered in the one-to-one interview format, with each student working individually with a teacher and their interactions videotaped. The remaining tasks were presented in the stations format, where four students worked around a series of task stations, supervised and assisted where appropriate by a teacher.

Presentation This Chapter presents the assessment results in the following order:

- released tasks attempted by year 4 and year 8 students
- link tasks attempted by year 4 and year 8 students, year 8 students only, and year 4 students only
- released tasks attempted only by year 8 students
- released tasks attempted only by year 4 students.

Each released task occupies one or more pages. The information provided includes the graph, table or map to be interpreted, the task instructions and questions, correct answers, and a table showing the percentages of students getting each question or task component correct. Some tasks also include a brief commentary on interesting features of the results.

Each link task occupies one quarter of a page. A broad indication is given of the nature of the task, and a table is provided showing the percentages of students getting each question or task component correct.

Results Averaged across all questions given to both year 4 and year 8 students, 86 percent of year 8 students produced correct responses, compared to 62 percent of year 4 students.

More than half of these questions were answered successfully by at least 90 percent of year 8 students. This indicates that, on average, students have progressed substantially between year 4 and year 8 in the skills assessed by the tasks.

Questions which required students to find and compare two items of information were particularly challenging for students at both levels, with low percentages of the year 4 students succeeding with these questions.

It is reassuring to note that some of the larger performance differences between year 4 and year 8 students occurred with questions involving formats or techniques which are generally not taught until after year 4 (such as pie graphs or line graphs).

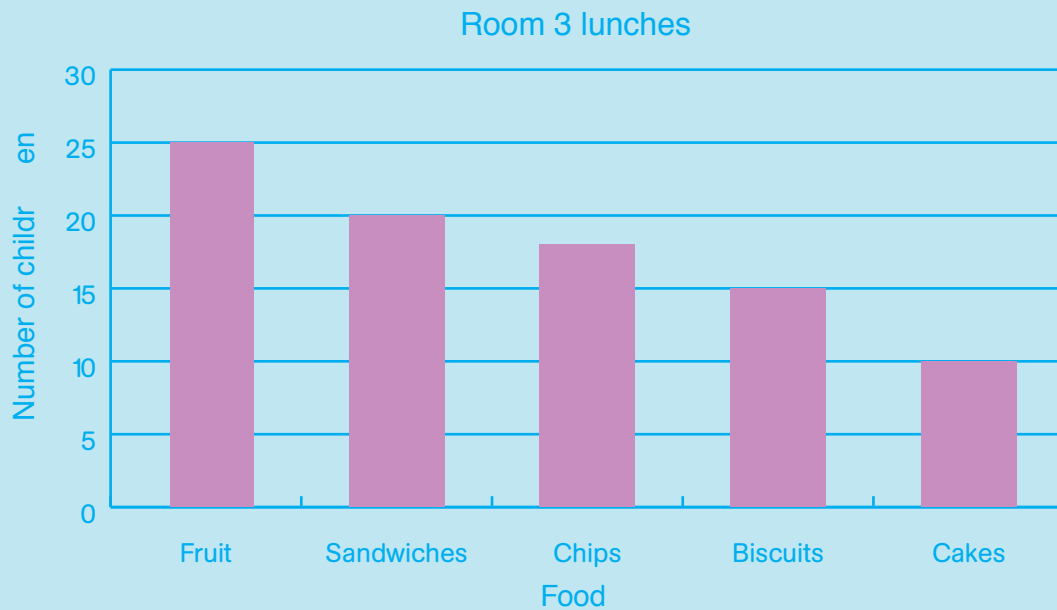
What's for Lunch

Approach: Station

Level: Year 8 & Year 4

Resources: Graph

Questions/Instructions



1. What food did most children have?
2. How many children had biscuits for lunch?
3. More children had sandwiches than cakes. How many more had sandwiches?

STUDENT RESPONSES

% answering correctly

	Year 8	Year 4
Fruit	99	90
15	98	63
10	73	27

Commentary

Question 3 required students to read the graph in two different places and subtract one reading from the other. This proved too difficult for most year 4 students.

Family Pictures

Approach: Stations

Level: Year 8 & Year 4

Resources: Text and graph

Questions/Instructions

The teacher asked the class to draw pictures of their families. Some drew stick figures, some drew only heads, some drew cartoon figures, and some drew life like sketches. The teacher put the pictures in piles and made this chart.



1. Which pile of pictures was the largest?
2. 5 children drew heads only.
How many children drew stick figures?

STUDENT RESPONSES

	% answering correctly	
	Year 8	Year 4
cartoon figures	97	90
5	69	28

Commentary

Question 2 required students to identify that the two relevant sectors were the same size, so that the number of drawings was the same for these two sectors. Year 4 students were much less able to do this than year 8 students.

Car Race

Approach: Station

Level: Year 8 & Year 4

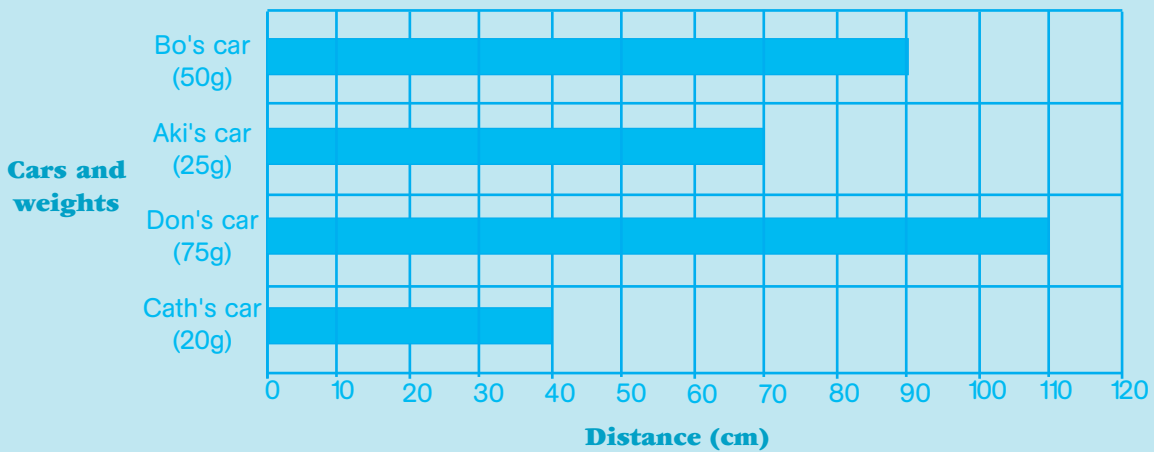
Resources: Text and graphic

Questions/Instructions

4 friends have a race with cars of different weights. They let the cars go at the top of a ramp and see how far they travel along the floor. The car that goes the longest distance is the winner.



This chart shows how far each car went.



1. Which car is the winner?
2. Which car is 3rd?
3. What do you notice about the weight of each car and the distance each travelled?

STUDENT RESPONSES

% answering correctly

	Year 8	Year 4
Don's	100	94
Aki's	95	83
the heavier the further	72	35

Kafte Bar

Approach: Station

Level: Year 8 & Year 4

Resources: Text and table

Questions/Instructions

Kafte bars are made of chocolate.
This information is on a Kafte bar wrapper.



Kafte Bar

Serving size	60g
Energy	1100kJ
Protein	3g
Fat	11g
Carbohydrate:	
Sugars	35g
Total	39g
Calcium	88mg
Vitamin E	2mg
Sodium	100mg
Potassium	150mg

1. How much fat is in a Kafte bar?
2. How much energy is in one Kafte bar?
3. How much of the carbohydrate in a Kafte bar is **not** sugar?

STUDENT RESPONSES

	% answering correctly	
	Year 8	Year 4
11g	99	90
1100kJ	97	88
4g	65	12

Commentary

Question 3 required careful interpretation of the table, reading two different numbers and subtracting one from the other. This proved too difficult for most year 4 students.

Two options for sending letters around New Zealand

POST

Our delivery targets are:

- Delivery across town by the next working day. (Across town is within city or town limits. For details of your access town area, simply ask at your nearest Post Shop.)
- Delivery out of town in 2-3 days.
- Delivery to or from a few remote areas may be longer.

fastPOST

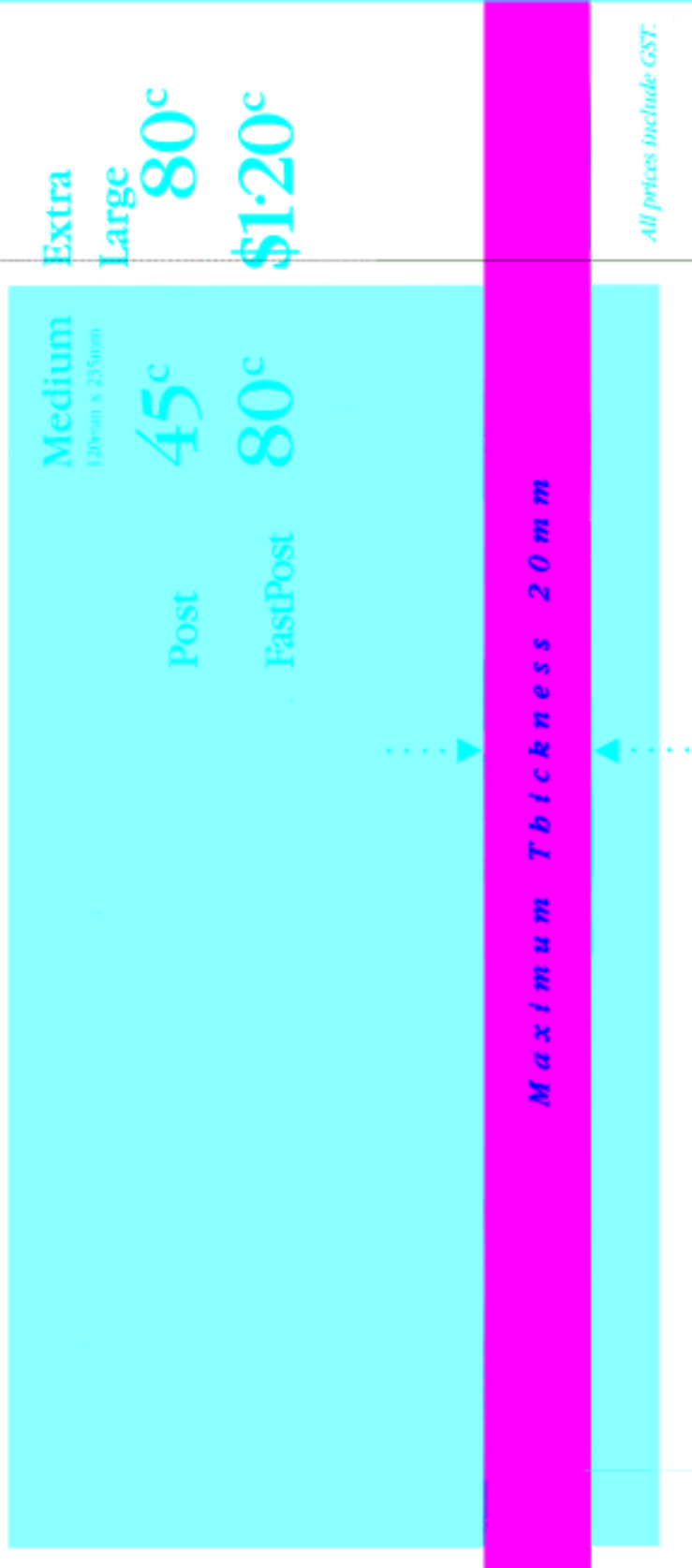
- Our target is delivery between major towns and cities by the next working day.
- Simply place a FastPost sticker on the top left-hand corner of your envelope along with the appropriate postage to ensure your mail receives FastPost delivery.
- Mail sent FastPost to or from a few remote areas may take longer.

Unbeatable Value

There are just two postage rates for sending letters by both Post and FastPost:

	Post	FastPost
Medium	45¢	80¢
Extra Large	50¢	\$1.20

Use the envelope size chart below to see what size your envelope is and what postage rate you should pay. If your envelope fits within the blue panel, it's a Medium envelope. If it's larger than the blue panel, it's an Extra Large envelope.



Letter Rates

Approach: One to one interview

Level: Year 8 & Year 4

Resources: Domestic letter rate chart (shown)

Four letters addressed within New Zealand:

1: Susan Cross: E24 envelope (165x241mm)

2: Kala Tom: E12 envelope (114x162mm)

3: Paul Thompson: E31 envelope (229x324mm)

4: Sam Reed: E20 envelope (114x225mm)

Questions presented orally.

1. How much will it cost to send this letter to Susan Cross by fastpost?
2. How much will it cost to send this letter to Kala Tom by ordinary post ?
3. How much will it cost to send this letter to Paul Thompson by ordinary post?
4. How much will it cost to send this letter to Sam Reed by fastpost?

STUDENT RESPONSES

% answering correctly

	Year 8	Year 4
\$1.20	25	24
45¢	95	77
80¢	89	67
80¢	90	73

Commentary

By the time the year 4 assessments took place, the postal rate for “medium” sized ordinary letters had been reduced to 40¢. Students were marked correct for Question 2 if they said the cost would be 40¢.

The very poor results at both levels for Question 1 suggests that the letter rate chart was difficult to

use for E24 envelopes. Perhaps the problem arose from the words used on the chart for envelope size: “medium” and “extra large.” Since the envelope in Question 3 was much larger than the envelope in Question 1, the students may have been unwilling to call both “extra large.” Perhaps New Zealand Post should redesign its domestic letter rate chart!

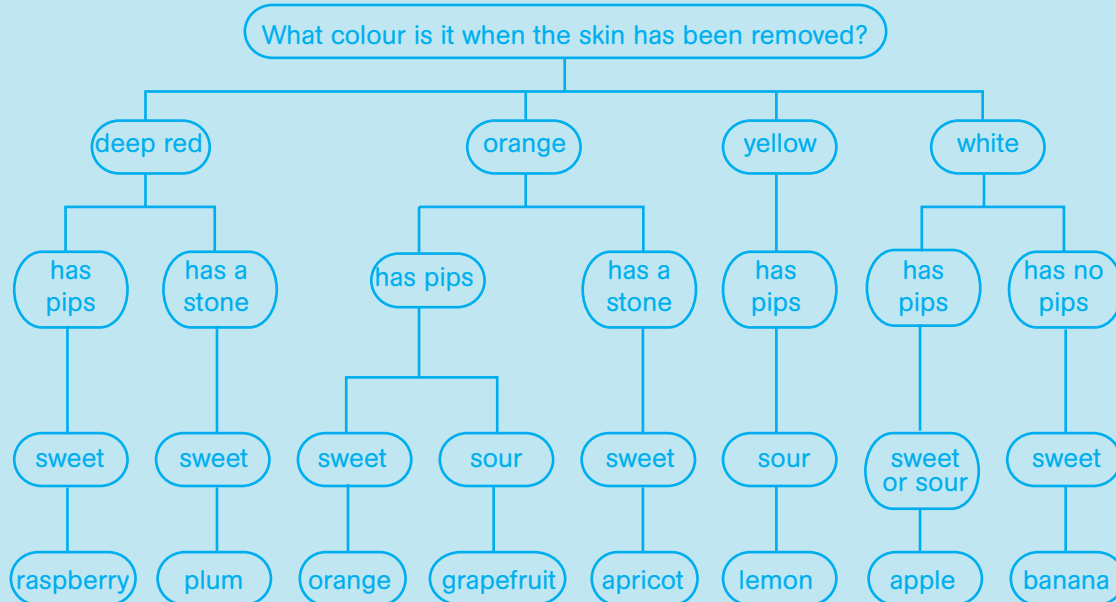
Fruit chart

Approach: Station

Level: Year 8 & Year 4

Resources: Flow chart

Questions/Instructions

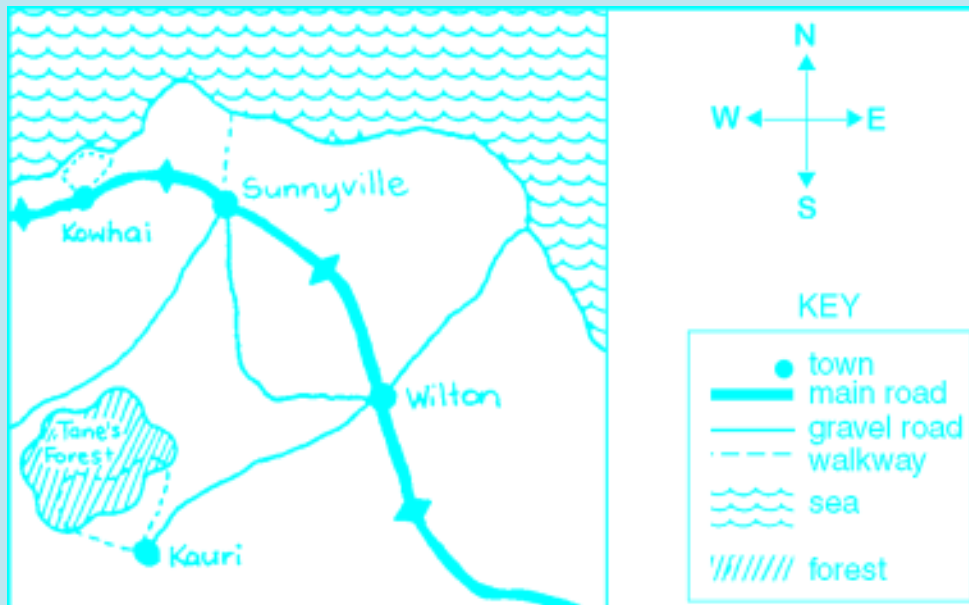


1. What is deep red and has a stone?
2. What is sour, has pips and is orange?
3. Use the flow chart to describe an apricot.
4. What fruit is described in the chart as being "sweet or sour"?

STUDENT RESPONSES

% answering correctly

	Year 8	Year 4
plum	96	70
grapefruit	91	53
orange has stone sweet	76	36
apple	90	49

Tane's Forest*Approach:* Station*Level:* Year 8 & Year 4*Resources:* Map and key*Questions/Instructions*

1. How many towns are shown on the map?
2. How many walkways are shown on the map?
3. Does the map show more sea or more land?
4. What does the line from Sunnyville to Kowhai mean?
5. Is Sunnyville north or south of Kauri?
6. Which town will you have to pass through when going from Sunnyville to Kauri?

STUDENT RESPONSES

% answering correctly

	Year 8	Year 4
4	96	82
3	76	42
more land	89	79
main road	84	31
North	70	56
Wilton	95	78

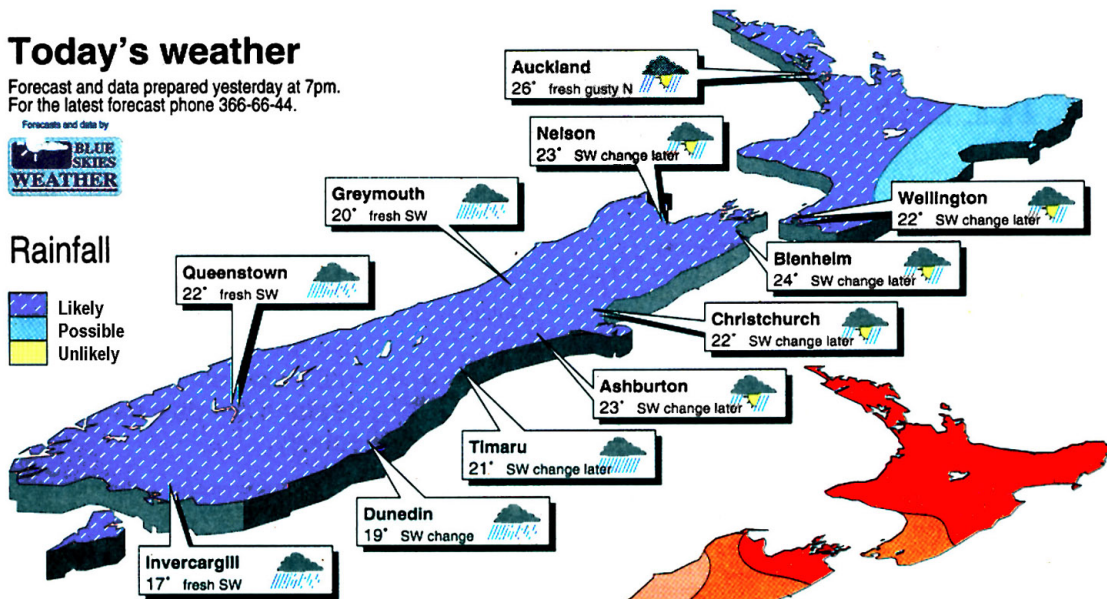
Today's weather

Forecast and data prepared yesterday at 7pm.
For the latest forecast phone 366-66-44.



Rainfall

- Likely
- Possible
- Unlikely



Temperature

- Mid twenties
- Low twenties
- High teens



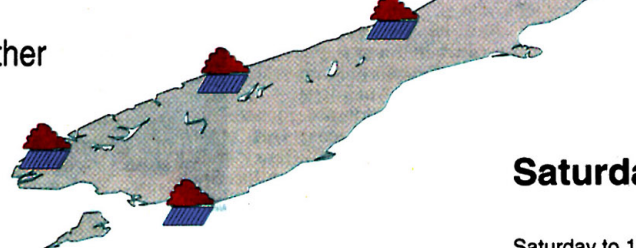
Cloudiness

- Mostly cloudy
- Partly cloudy
- Mostly sunny



Extreme weather

- gales
- snow
- hail
- heavy rain
- thunder storms



Regional forecasts

Canterbury and Marlborough: Fine at first today with some high cloud and a risk of a few isolated showers. Warm with fresh gusty N quarter winds. Cooler SW winds are expected to develop later in the day with more widespread showers likely. **Nelson:** Cloud increasing today with some rain developing. Warm, possibly very warm, with fresh gusty N winds. Cooler SW winds are expected late in the day with rain easing to showers and increasing fine periods. Showers should clear tonight. **West Coast and ranges:** Cloudy today with some rain, some falls possibly heavy and squally. Cooler SW winds developing with rain easing showers and increasing fine periods. Most showers clearing tonight. **Tomorrow:** Mostly fine in Canterbury, Marlborough and Nelson with some long sunny periods but some areas of cloud too. Mild with light to moderate SW winds. NE winds may develop near the east coast. Any remaining morning showers clearing from the West Coast and ranges with mostly fine weather developing. Cool westerly winds developing.

Saturday's readings

	Sun (hrs)	Rain (mm)
Saturday to 10pm	9.8	0.0
To date this month	85	16
Average for March	163	54
To date this year	515	86
Average to date	448	115
Temperatures (°C)		
	max	min
Saturday	3:41pm 18.1	5:08am 11.1
To date this month	25.8	8.2
Average for March	20.1	10.6
Grass (frost reading)		+9.9
Saturday's max wind gust:	7:10pm ENE	56 km/h
At 6pm:	Humidity 74%	Barometer 1017 hPa

Today's Weather

Approach: One to one interview

Level: Year 8 & Year 4

Resources: Weather map

Questions/Instructions

In this activity you are going to use these weather forecast maps to find information.

1. Have a look at the weather maps. The top one has Greymouth marked with an arrow. Can you find Greymouth and point to it?

(Show the student if they can't find it.)

2. Tell me three things about the weather forecast for Greymouth.

rain or heavy rain; mostly cloudy;
fresh SW; high teens or 20 ;

3. Now find Stewart Island and point to it.

(Help the student if necessary.)

4. What is the temperature at Stewart Island expected to be like today?

5. Look at the weather maps again. Imagine that today is sports day at school on Stewart Island. If the weather is too bad, the sports will be held next week instead.

- Do you think the school should have sports day today? Explain to me why you think that.

STUDENT RESPONSES

% answering correctly

	Year 8	Year 4
	98	92
	76	32
	85	47
high teens	66	28
No: rain	85	NA

Museum Floor Plan

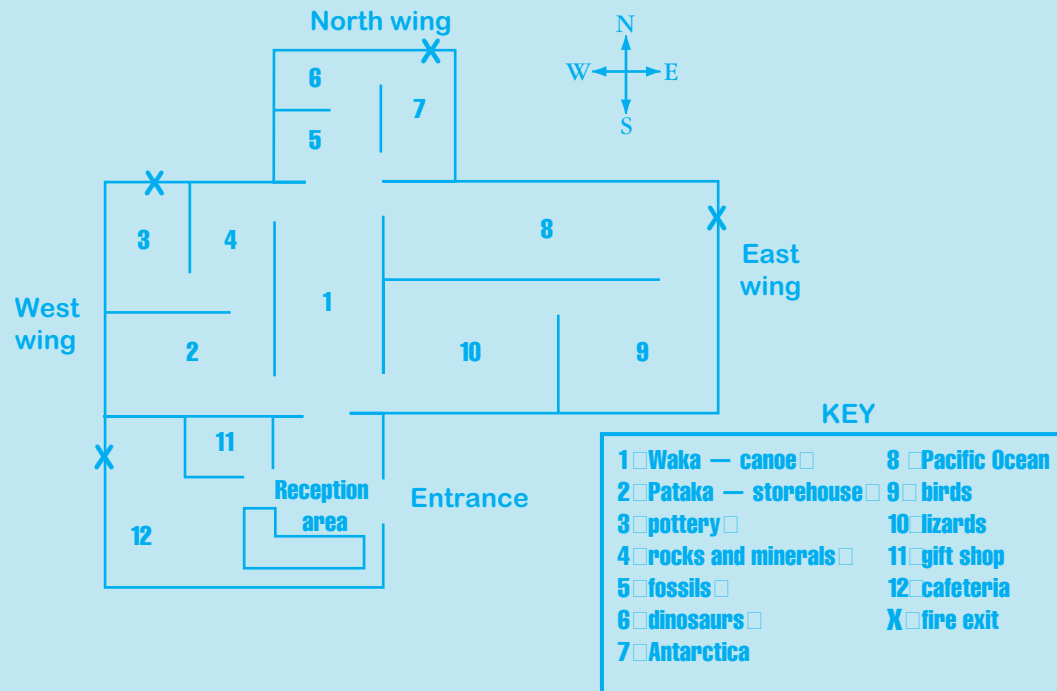
Approach: One to one interview

Level: Year 8 & Year 4

Resources: Floor plan and key

Questions/Instructions

Tangata Museum



1. If you went to area 6 in the museum what would you see?
2. What does the x-shape mean on the floor plan?
3. What are the names of the displays in the east wing of the museum?
4. Imagine we are in the reception area and you are telling me the directions to get to the pottery display. Explain to me how I would get to the pottery display. Explain it without pointing to the plan.

STUDENT RESPONSES

% answering correctly

	Year 8	Year 4
dinosaurs	98	77
fire exit	98	73
Pacific Ocean		
birds		
lizards	88	60
via 1,2 & 4 or 1 & 4	53	21

Link Tasks Year 8 and Year 4

Link task 1

Approach: One to one interview

Resources: Pie graph

	STUDENT RESPONSES	
	% answering correctly	
	Year 8	Year 4
Question 1	92	77
Question 2	99	92
Question 3	97	83
Question 4	92	78

Link task 2

Approach: Stations

Resources: Table and text

	STUDENT RESPONSES	
	% answering correctly	
	Year8	Year4
Question 1	98	82
Question 2	96	80
Question 3	96	81

Link task 3

Approach: Stations

Resources: Line graph and text

	STUDENT RESPONSES	
	% answering correctly	
	Year8	Year4
Question 1	89	59
Question 2	76	37
Question 3	89	56
Question 4	85	42

Link task 4

Approach: One to one interview

Resources: Street map and index

	STUDENT RESPONSES	
	% answering correctly	
	Year8	Year4
Question 1	98	92
Question 2	97	86
Question 3	44	25
Question 4	95	NA

Link Tasks Year 4 only

Link task 5

Approach: Station

Resources: Pie graph

	STUDENT RESPONSES	
	% answering correctly	
	Year4	
Question 1	81	
Question 2	36	

Link task 6

Approach: One to one interview

Resources: Timetable

	STUDENT RESPONSES	
	% answering correctly	
	Year4	
Question 1	56	
Question 2	72	
Question 3	69	
Question 4	69	

Link Tasks Year 8 only

Link task 7

Approach: Station

Resources: Road map and table

STUDENT RESPONSES		% answering correctly
		Year8
Question 1a	65	
b	63	
Question 2a	56	
b	54	
Question 3	60	
Question 4a	60	
b	51	

Link task 8

Approach: Station

Resources: Complex table

STUDENT RESPONSES		% answering correctly
		Year8
Question 1	44	
Question 2	46	
Question 3	78	
Question 4	62	

Link task 9

Approach: Station

Resources: Composite bar graph

STUDENT RESPONSES		% answering correctly
		Year8
Question 1	99	
Question 2a	85	
b	25	
Question 3	77	

Link task 10

Approach: One to one interview

Resources: Complex table and text

STUDENT RESPONSES		% answering correctly
		Year8
Question 1	79	
Question 2	58	

Weet-bix Breakfast

Approach: Station

Level: Year 8 only

Resources: Colour reproduction of end panel of cereal packet, with nutritional table.

Questions/Instructions

Linda, Fay and Peter are having Weet-bix for breakfast.

Linda is having 2 Weet-bix with 1/2 cup of standard milk.

Fay is having 2 Weet-bix with 125ml of So Good.

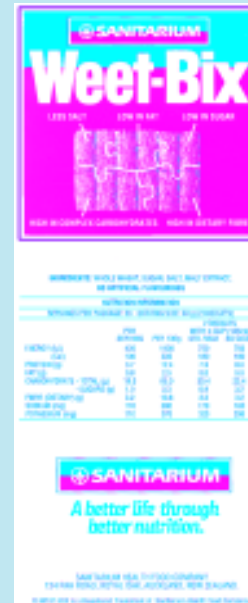
Peter is having 100g of Weet-bix without any milk.

INGREDIENTS: WHOLE WHEAT, SUGAR, SALT, MALT EXTRACT,
NO ARTIFICIAL FLAVOURINGS

NUTRITION INFORMATION

SERVINGS PER PACKAGE: 33 SERVING SIZE: 30 g (2 BISCUITS)

	PER SERVING	2 BISCUITS	
		PER 100g	WITH 1/2 CUP (125ml) STD. MILK SO GOOD
ENERGY (kJ)	420	1400	750
(Cal)	100	335	180
PROTEIN (g)	3.7	12.4	7.9
FAT (g)	0.8	2.5	5.0
CARBOHYDRATE - TOTAL (g)	19.5	65.0	25.4
- SUGARS (g)	1.0	3.3	6.9
FIBRE (DIETARY) (g)	3.2	10.8	3.2
SODIUM (mg)	110	390	170
POTASSIUM (mg)	110	370	320



1. How many calories (Cal) is Linda having?
2. How many calories (Cal) is Peter having?
3. How much carbohydrate-sugars is Linda having?
4. How much carbohydrate-sugars is Fay having?
5. How much protein is Peter having?
6. How much protein is Fay having?

STUDENT RESPONSES

% answering correctly
Year 8

180 59

335 66

6.9g 44

3.2g 48

12.4g 73

8.0g 60

Air timetable

Approach: One to one interview

Level: Year 8 only

Resources: Air New Zealand Business Week Timetable (excerpt shown)

Questions/Instructions

Presented orally.

I want you to use the Air New Zealand Business Week Timetable to answer some questions. We will assume that all of the flights are on time.

WELLINGTON TO CHRISTCHURCH					CHRISTCHURCH TO WELLINGTON				
DAY	DEPART	ARRIVE	FLIGHT	MEAL	DAY	DEPART	ARRIVE	FLIGHT	MEAL
	7.15am	8.00am	407	b		7.00am	7.45am	410	b
	8.20am	9.05am	447	b		8.30am	9.15am	422	b
	8.45am	9.30am	405	b		10.00am	10.45am	434	s
	9.45am	10.30am	411	s		12.30pm	1.15pm	450	s
except Wed	12 noon	12.45pm	421	s	except Wed	2.15pm	3.00pm	452	s
	1.05pm	1.50pm	427	s		3.30pm	4.15pm	460	s
	2.15pm	3.00pm	438	s		4.15pm	5.00pm	464	s
	4.45pm	5.30pm	445	s		5.10pm	5.55pm	474	e
	6.00pm	6.45pm	457	e		6.00pm	6.45pm	478	e
	7.35pm	8.20pm	463	e		7.15pm	8.00pm	482	e
	8.50pm	9.35pm	468	e		8.00pm	8.45pm	488	e

AUCKLAND TO DUNEDIN					DUNEDIN TO AUCKLAND				
DAY	DEPART	ARRIVE	FLIGHT	MEAL	DAY	DEPART	ARRIVE	FLIGHT	MEAL
	6.45am	9.15am	507	b/b		7.30am	10.10am	415	b/b
	8.30am	11.20am	415	b/b		7.45am	10.15am	508	b/b
	12 noon	2.30pm	523	s/s		9.45am	12.15pm	516	s/s
	3.50pm	6.20pm	538	s/e		12.20pm	3.00pm	648/450	s/s
	5.00pm	7.30pm	547	e/e	Full city	3.00pm	6.30pm	672/542	s/e
						7.05pm	9.40pm	554	e/e
						8.00pm	11.20pm	560	e/e

AUCKLAND TO INVERCARGILL					INVERCARGILL TO AUCKLAND				
DAY	DEPART	ARRIVE	FLIGHT	MEAL	DAY	DEPART	ARRIVE	FLIGHT	MEAL
	8.50am	12.05pm	509	b/b		6.45am	10.15am	508	-b/b
	12.45pm	3.30pm	527	s/s		12.35pm	3.20pm	530	s/s
	3.50pm	7.30pm	538	s/e		4.00pm	6.30pm	678/542	s/e

KEY TO MEAL CODES: - = no meal
 b = breakfast s = snack
 e = both dinner

UNLESS SPECIFIED ALL FLIGHTS OPERATE MONDAY TO FRIDAY
 INCLUDING ALL FLIGHTS ARE OPERATED BY 737 AIRCRAFT
 PROVIDING BUSINESS AND ECONOMY CLASSES.

1. What time does the last flight from Christchurch to Wellington depart?

What would be the best flight from Auckland to Dunedin if you wanted to be in Dunedin by 1pm?

- 2a What is the flight number?
- 2b What time does the flight depart from Auckland?
- 2c What time does the flight arrive in Dunedin?

3. If a friend is arriving at Invercargill from Auckland on flight 527, what time will they arrive?

STUDENT RESPONSES

% answering correctly
Year 8

9pm 85

415 91

8.30am 91

11.20am 90

3.30pm 95

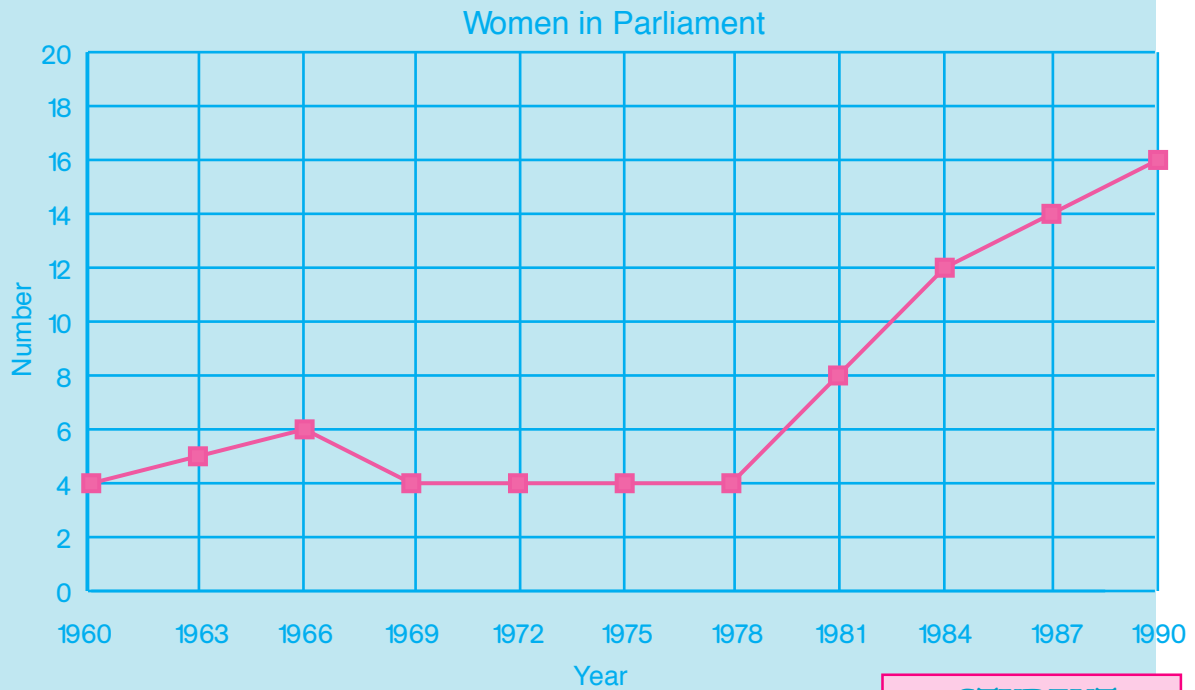
Women in Parliament

Approach: Stations

Level: Year 8 only

Resources: Line graph

Questions/Instructions



1. How many women were in parliament in 1975?
2. When did the number of women in parliament start to increase most quickly?
3. Write down one other important thing the graph tells about women in parliament.

Eg 4x as many women in 1990 than 1978;
very little change between 1960 and 1978

STUDENT RESPONSES

	% answering correctly
4	97
1978 or 1981	59
	27

Commentary

In Question 2, the most correct response was 1981. Only 24% of students chose that response. Visually, the correct response was 1978, chosen by 35% of students. Both counted as correct in the above table.

Question 3 proved particularly demanding. Many answers were quite vague; others focused on details that were much less important than the major trends.

Staying on at School

Approach: One to one interview

Level: Year 8 only

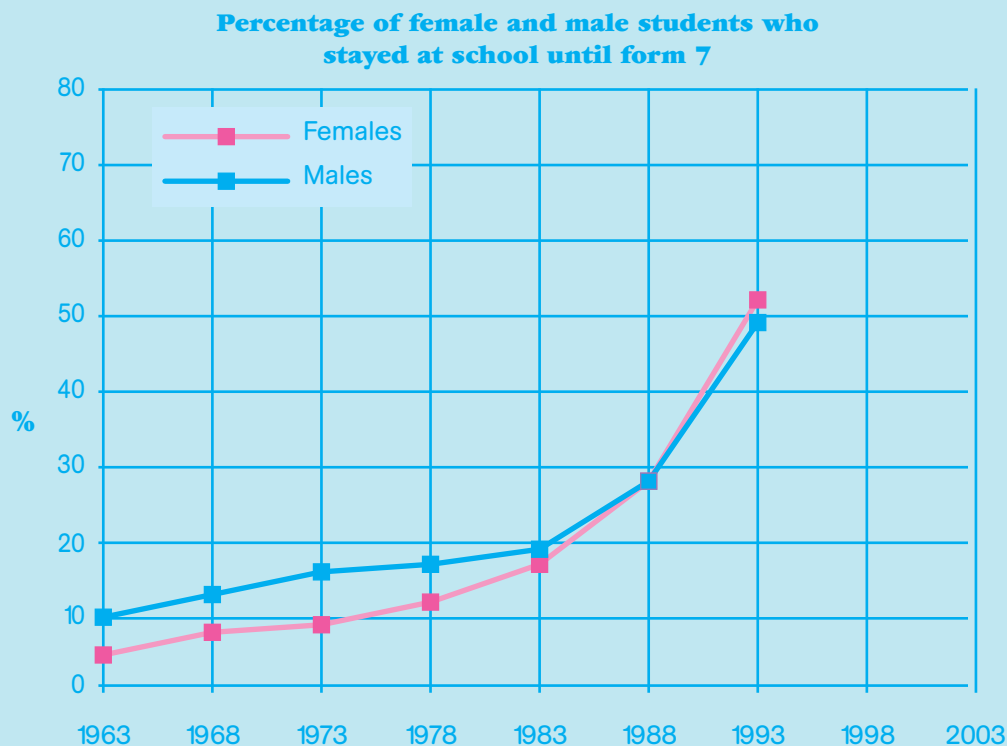
Resources: Graph

Questions/Instructions

Presented orally.

This graph shows the percentage of female and male students who stayed at school until Form 7.

I want you to try to answer some questions by looking at the graph.



1. In 1993, did a higher percentage of female or a higher percentage of male students stay at school for form 7?

2. Tell me 3 other things this graph shows.

Eg large increase since 1983,
girls have overtaken boys

3. Draw on the graph what you think will happen in 1998. Why do you think that will happen?

Marked for consistency between what was
drawn and what was said

STUDENT RESPONSES

% answering
correctly
Year 8

female
higher 70

3
1 or 2 36
34

26

Tuatua School Electricity

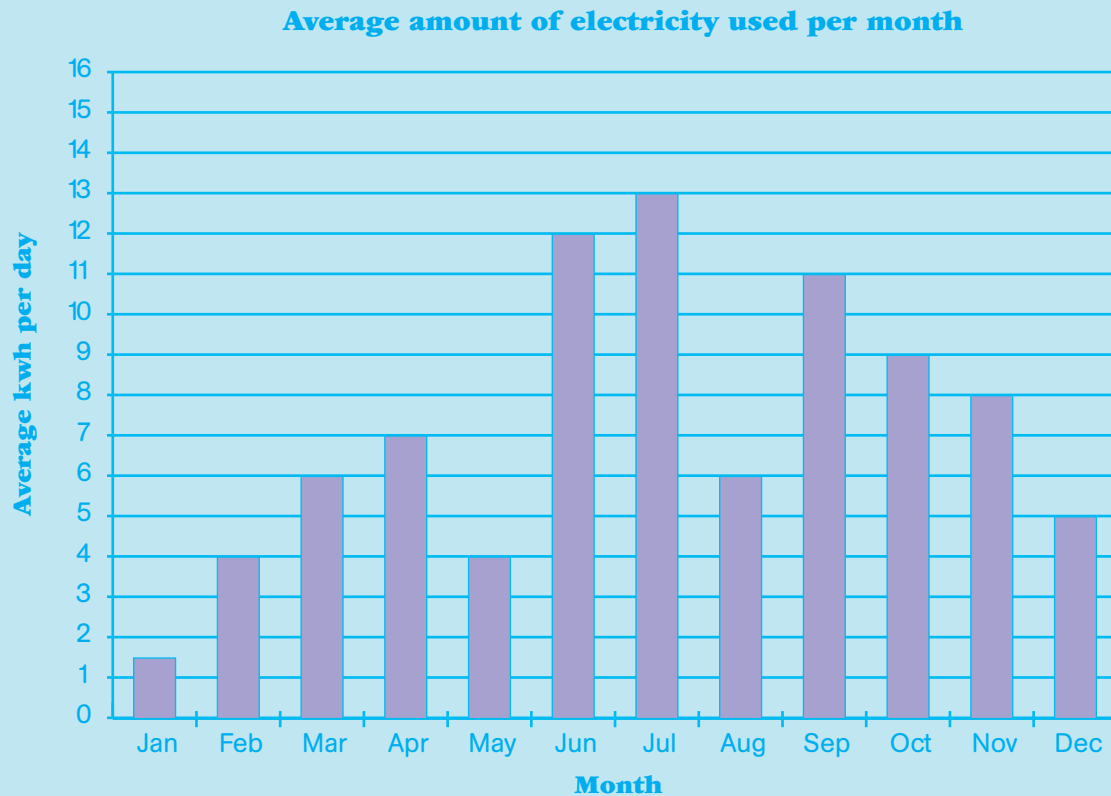
Approach: Station

Level: Year 8 only

Resources: Text and graph

Questions/Instructions

The principal of Tuatua School has been working out how much electricity the school used in a year. He made this graph.



1. Which months had an average of more than 10kwh per day?
2. What was the average kwh use per day for June?
- 3a. Which month has the lowest use of electricity per day?
- 3b. Why do you think that month was lowest?

Eg. school closed, no need for heat and light

STUDENT RESPONSES

% answering correctly

Year 8

June, July, September	73
12	79
January	97
	57

Biscuit Eating

Approach: One to one interview

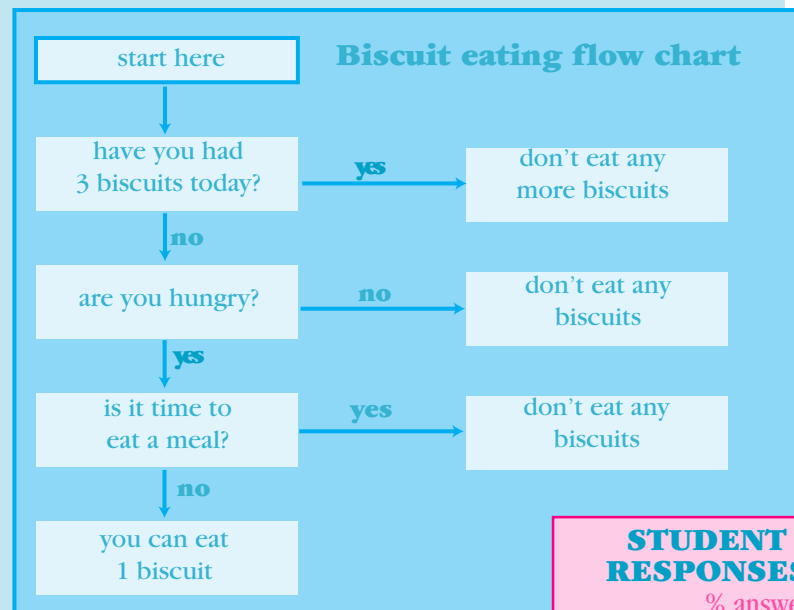
Level: Year 4 only

Resources: Flow chart and question summary

Questions/Instructions

Billy, Brent and Pip look at this chart to see if they can have a biscuit. They start at the box which says **Start here**. They read the question, then follow the **yes** or **no** arrow to find out what they can do.

I want you to use the chart, and follow the arrows, to find out what Billy, Brent and Pip can do.



1a Billy has eaten 3 biscuits today.
Can Billy have another biscuit?

1b Why do you say that?

Indicates following the chart

2a Brent is hungry. He has had 1 biscuit today.
It is time to eat tea. Is he allowed a biscuit?

2b Why do you say that?

Indicates following the chart

3a Pip has not had any biscuits today. She is hungry but
it is not time for lunch yet. What does the chart say
Pip can do?

3b Why do you say that?

Indicates following the chart

STUDENT RESPONSES

% answering correctly
Year 8

No 90

60

No 72

43

Eat 1 71

45

Commentary

Students got confused between “no” or “yes” on the flow chart and the answer they were giving. For instance, for Billy they had to follow the “yes” arrow, but then answer “no.”