Science education encourages students to have inquiring minds and to make sense of the actions and interactions of the biological and physical features of their environment.

The science curriculum is organised into four major areas of learning which are intended to help students make sense of the living world, the physical world, the material world, and planet Earth and beyond. Since science is both a process of enquiry and a body of knowledge, the curriculum also requires that students are helped to develop scientific ideas, skills and attitudes, and "acquire an understanding of the nature of science and its relationship to technology".

This chapter reports the results of eighteen science tasks administered to individual Māori students in both general education settings and Māori immersion settings. Results for fifteen additional tasks administered to individual Māori students in both types of settings are not reported here because less than 70 percent of the students in Māori immersion settings completed these tasks (for reasons explained in Chapter 2).

Of the eighteen tasks included here, six were administered in one-to-one interview format and eleven were attempted in a stations format (where students worked independently on a series of paper and pencil tasks, many of which included the use of hands-on materials or visual information). The last task was administered in paper-and-pencil format during a team and independent session.

National monitoring results are reported task by task so that results can be understood in relation to what the students were asked to do. To allow comparisons of performance between the 1999 and 2003 assessments, however, seven of the eighteen tasks have been designated *link tasks*. Student performance data on these tasks are presented in this report, but the tasks are described only in general terms because they will be used again in 2003.

Two of the eighteen tasks reported here had significant problems with the translation for the Māori language version. These problems are clearly identified in the commentaries for the tasks. This left sixteen tasks on which the performance of Māori students in general education and Māori students in Māori immersion settings could be compared. The two categories of students performed equally well on twelve tasks, with students in immersion programmes scoring statistically significantly higher on one task and Māori students in general education scoring statistically significantly higher on three tasks. These comparisons must be viewed with considerable caution, for the reasons discussed in Chapter 2.

Pātiki — Flounder

Approach: One to one

Focus: Observe a flounder and identify its features with adaptive significance to its habitat on the sandy bottom of the ocean.

Resources: Video of flounder in its habitat.

Questions/instructions:

We're going to watch a video that shows shots of a flounder living on the sandy bottom of the sea. The flounder has some features that help it live in this environment. Watch the video carefully. After the video I want you to tell me about the features that help the flounder live in its environment.

Ka mātakitaki ataata tāua mō te noho a te pātiki i ngā onepū o te takere o te moana. Kei te pātiki ētahi āhuatanga e āhei ai tana noho i tēnei taiao. Āta mātakitakihia te rīpene ataata. Ka mutu ana, kōrerotia mai ngā āhuatanga e āhei ai te pātiki ki te noho i tēnei taiao.

Play video.

1. What is special about flounders that help them live in the sandy bottom of the sea? Tell me as many things as you can. *Prompt: How does that help them?* He aha ngā tino āhuatanga o te pātiki, i āhei ai rātou ki te noho i ngā onepū o te takere o te moana? Kōrerohia mai ngā āhuatanga katoa ka taea ana e koe. *He āwhina: Pēhea ai te āwhina atu o ēnei āhuatanga?*		*% responses* GEd	MI
Colour effective camouflage — identifies:			
	feature and explains value	16	8
	feature only	31	52
Flat shape of body — identifies:			
	feature and explains value	22	4
	feature only	23	71
Eyes on one side of body — identifies:			
	feature and explains value	15	0
	feature only	8	6
Side fins — identifies:			
	features and explains value	9	0
	feature only	11	4
Tail — identifies:	feature and explains value	11	0
	feature only	8	2
Total score:	6–10	6	0
	3–5	31	12
	1–2	44	80
	0	19	8

Commentary:

The performance of some MI (Māori Immersion) students was affected by their limited Māori language skills. They might have been helped if the introductory paragraph had used the idea of hiding (huna). MI (Māori Immersion) students scored statistically significantly lower than GEd (General Education) students.

He Urutaunga Kararehe – Te Ngata — Animal Adaptation – Snail

Approach: Station

Focus: Observe and describe the structural features of a snail that are considered to be adaptive features with survival value.

Resources: Picture of snail.

Questions/instructions:

Look carefully at the picture. Write about the parts of the snail that help it to survive.

An example has been done for you.

Snail

The shell's brown colour helps the snail hide from its enemies.

Āta titiro ki te whakaahua. Tuhia he kōrero mō ngā wāhanga tinana o te ngata, kei reira nei tōna oranga.

Anei tētahi tauira.

Te Ngata

Āwhina ai te tae parauri o tōna anga kia ngaro atu ia i ōna hoa ngangare.

[enemies]

	% responses GEd	MI
shell protects soft parts inside from predators	30	15
shell keeps body moist	1	0
body can withdraw totally into shell	25	26
body uses slime to allow snail to slide easily and safely	48	22
slime closes entrance to shell for temperature control	2	7
eyes used to see (light and dark)	64	37
tentacles used to touch, smell and taste	40	28
mouth used to eat	12	20
Number of valid responses: 4–5	11	4
2–3	61	50
0–1	28	46

Commentary:

The performance of some MI (Māori Immersion) students was affected by their limited Māori language skills. Also, the phrase "kei reira tōna oranga" was ambiguous. Because of the latter fault, a statistical comparison of GEd (General Education) and MI (Māori Immersion) student performances was not appropriate.

Kai Moana

Approach: Station

Focus: Demonstrate knowledge of the identification and specific coastal habitat of 10 seafoods (kai moana).

Resources: Picture of coastal scene, sticker with names of seafoods.

Questions/instructions:

Kai moana means seafood. Different seafoods are found in different places. You have a seaside map and 10 pictures of sea foods.

Ka kitea ngā momo kaimoana katoa i ngā momo wāhi katoa. Tekau ngā pikitia kai moana rerekē kei a koe, me tētahi mahere o te taha moana.

1. Stick each picture on the map to show where it would usually be found.
   Whakapiria tēnā me tēnā o ngā pikitia ki runga i te mahere hei whakaatu i te wāhi ka kitea.

Here are 10 pictures of kai moana and a list of their names.

Anei ētahi pikitia tekau o ngā kaimoana me tētahi rārangi o ngā ingoa.

2. Write the number for each seafood beside its name. The first one is done for you.
   Tuhia te tau mō ia kaimoana ki te taha o te ingoa. Kua oti atu te mea tuatahi.

English	Māori		% responses GEd	% responses MI
Paua	Paua	clings to rocks in deep sea	55	69
Kina	Kina	identified picture 8	96	100
		rocky areas, low tide pools near shore	51	75
Oyster	Tio	identified picture 6	98	71
		upper tidal rocky area	43	65
Crayfish	Kōura	identified picture 9	98	100
		deep water, near rocks	60	62
Crab	Pāpaka	identified picture 4	98	82
		exposed beaches, low tide areas	65	86
Snapper	Tāmure	identified picture 10	94	75
		deep sea	67	76
Mussel	Kuku	identified picture 2	98	60
		rocky areas, deep water beds	41	63
Eel	Tuna	identified picture 7	100	94
		fresh water, streams, rivers	70	81
Cockle/pipi	Tuangi	identified picture 5	84	56
		beachs near low tide level	56	73
Flounder	Pātiki	identified picture 3	93	88
		shallow tidal flats, estuaries	35	61

Commentary:

Quite often, the MI (Māori Immersion) students showed greater knowledge of where the seafood could be found, but less knowledge of the name of the seafood. The difference between MI (Māori Immersion) and GEd (General Education) students in overall performance was not statistically significant.

He Manu — Birds

Approach: Station

Focus: Recognise from prior knowledge a selection of birds, define the term "native bird," and identify those that fit in this category.

Resources: Pictures numbered 1–8.

Questions/instructions:

1. Look at the bird pictures. Match the birds in the pictures with their names on the chart. Write the number of the bird beside its name.
   Titiro ki ngā whakaahua o ngā manu. Whakaritea ngā whakaahua manu kia hāngai ki ō rātou ingoa. Tuhia te tau o te whakaahua manu ki te taha o tōna ingoa.

English Bird names ingoa manu	*Māori*	number te tau	✓ native birds ✓manu māori	*% responses* GEd	MI
fantail	pīwakawaka	4		95	78
thrush	tiutiu, korohea	6		36	12
shag	kawau	2		53	55
sparrow	tiu	3		53	14
waxeye	tauhou	8		42	27
pukeko	pūkeko	5		82	92
woodpigeon	kererū	1		55	86
kingfisher	kōtare	7		65	37

2. Some of these birds are native to New Zealand. What do we mean by "native" birds?
   Ko ētahi o ēnei manu he manu māori o Aotearoa. He aha te tikanga o te "manu māori"?

not introduced to NZ	2	19
found only in NZ	14	28

3. Tick the birds that you think are native to New Zealand.Put your ticks in the "native birds" column. Results not recorded here.

Commentary:

Compared to GEd (General Education) students, MI (Māori Immersion) students performed better in naming some distinctive native birds, but worse on introduced species. Overall, MI (Māori Immersion) students scored statistically significantly lower than GEd (General Education) students.

Te Whakamakere Moni — Dropping Coins

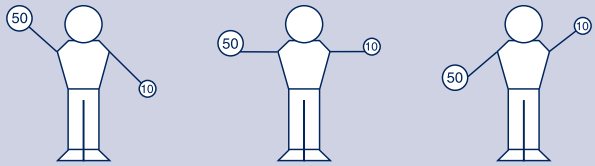
Approach: Station

Focus: Students demonstrate their intuition or prior learning about the effects of gravity on objects of differing mass, then carry out a practical investigation and interpret the outcome.

Resources: 50c coin, 10c coin.

Questions/instructions:

In this activity you will be finding out about how things fall.



1. THINK FIRST — do not try it yet.

   You have a 10 cent coin and a 50 cent coin.

   Which picture do you think shows a way to hold the coins before you drop them so they will hit the floor at the same time?

   Circle the picture which you think shows the best way.

I tēnei mahi ka kitea e koe pēhea ai te makere o ētahi mea.

ĀTA WHAKAARO —
kaua e whakamātauria ināianei.

He tekau hēneti
me te rima tekau hēneti tāu.

Ki ōu whakaaro ko tēhea te pikitia e whakaatu ana i te āhua pupuri i ngā moni i mua i te makeretanga, **kia kotahi ai te tau** a ngā moni ki te papa?

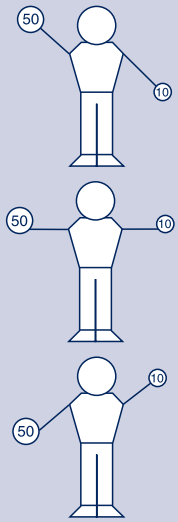
Porohitatia te pikitia e tika ana **ki a koe**.

	% responses GEd	MI
✓ same level	54	43

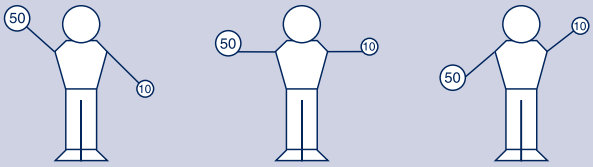
2. NOW TRY IT.

   Hold your arms in each of the different ways and drop the coins. Write down which coin hit the floor first.

   KEI A KOE INĀIANEI
   Torona ō ringa kia rerekē pērā i ērā o ia pikitia, ā, ka whakamakere ai i ngā moni. Tuhia te moni i tau tuatahi ai ki te papa.



	% responses GEd	MI
10c first	83	57
✓ both together	61	53
50c first	83	72



3. Which is the best way to hold your arms so the coins hit the floor at the same time?

   Circle the picture which you think shows the best way.

   Ko tēhea te toro tino pai mō ō ringa, kia kotahi ai te tau a ngā moni ki te papa? Porohitatia te pikitia e tika ana ki a koe.

	% responses GEd	MI
✓ same level	88	74

4. What could you do to check your results in question 2?

   Me aha koe e whakaritea ai ō otinga i te pātai tuarua?

repeat test	55	61
have second observer	24	6

Commentary:

MI (Māori Immersion) students scored statistically significantly lower than GEd (General Education) students.

He Waea Pirikoko — Mystery Wires

Approach: Station

Focus: Use a continuity tester (linked battery and bulb) to test and decide which of 6 wires are connected.

Resources: Continuity tester (linked battery and bulb with alligator clips), cardboard with 6 wires sticking out. (blue and grey wires connected internally, red, cream and yellow wires all connected internally)

Questions/instructions:

In this activity you will be finding out how the wires are connected inside the cardboard.

I tēnei mahi ka rapu koe i pēheatia te tūhonohonoa o ngā waea i roto i te papakāri.

1. Check that everything on the board is working by touching the 2 loose alligator clips together.

   The bulb will go if everything is working. If the bulb does not go, tell the teacher now.

   Whakamātauria mena kei te ora ngā mea katoa o te papa pūaho [bulb board], mā te whakapā i ngā rawhi kakati [alligator clips] e rua.
   Mena e ora ana, ka kā mai te pūaho.
   Ki te kore e kā mai te pūaho, me kōrerohia atu ki te kaiako ināianei.

Inside the cardboard some of the wires are joined to other wires. Each wire might be joined to 1 other, 2 others, or no others.

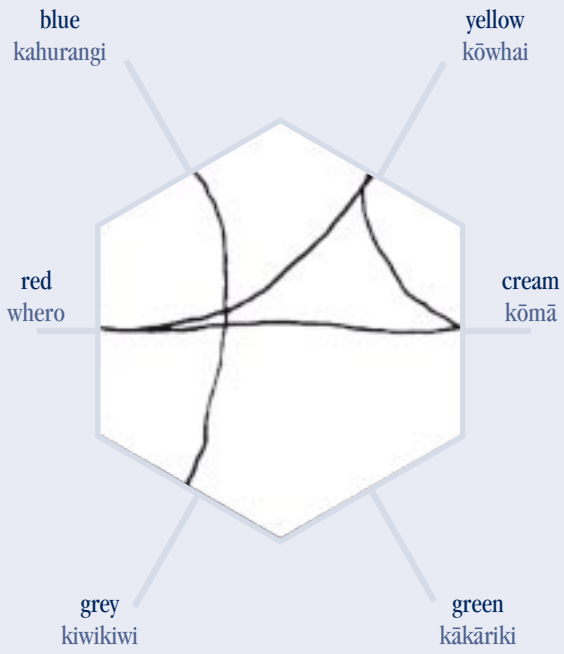
Use the board with the battery and bulb to find out which wires are connected.

I roto i te papakāri [cardboard], kua tūhonoa ētahi o ngā waea ki ētahi atu. Tērā pea, ia waea kua honoa atu ki tētahi atu, e rua atu rānei, ki te kore noa iho rānei.

Whakamahia te papa o te pūhiko me te pūaho, kia kitea ai ko ēhea waea e tūhono ana.

2. Draw lines on the diagram below to show which wires are connected.

   Tuhia ngā rārangi ki te hoahoa [diagram] i raro iho nei hei whakaatu ko ēhea ngā waea e tūhono ana.



Students saw labels in either English or Māori

	% responses GEd	MI
green wire not connected to any other	84	74
blue and grey wires connected to each other only	62	60
red, yellow and cream wires all connected to each other and no others	71	57

Commentary:

The small differences in performances between the GEd (General Education) and MI (Māori Immersion) students were not statistically significant.

Wai Mīharo — Wonderful Water

Approach: Independent
Focus: Explain buoyancy and flotation in three situations.
Resources: None

Questions/instructions:

Look at the pictures then answer the questions.

Tirohia ngā pikitia, kātahi ka whakautu i ngā pātai.

1. Imagine that you have a ball of plasticine. You put it in water and it sinks. Then you shape it into a boat. Now it floats. Why did the ball of plasticine sink but the boat float?
   Tēnā me pohewa noa he poi kerepēhi [ball of plasticine] tāu. Ka kuhuna e koe ki rōto i te wai, ka totohu. Kia hangaia e koe hei waka, kātahi ka mānu. He aha te poi kerepēhi i totohu ai, i mānu kē ai ko te waka?

	% responses GEd	MI
boat shape displaces enough water to hold weight of plasticine	0	0
more spread out so it floats/ water holds it up there	4	5
because there is air inside it.	29	11

2. Why do things feel lighter when you pick them up under water?
   He aha i māmā ake ai he mea ka hikina ana mai i raro i te wai?

	% responses GEd	MI
some of the weight is supported by the water displaced	2	5
because water is less dense than air	1	2
there is less or no gravity under water	21	13

3. Someone holds the ball at the bottom. Why does it jump out of the water when they let it go?
   Ka pupuritia e tētahi te poi ki raro. Kia tukua, nā te aha i peke ake ai te poi?

	% responses GEd	MI
Under the water:		
ball weighs less than the water displaced	1	0
air in the ball makes it rise	43	36
Above the water:		
ball moves upward because of inertia	0	0
ball is going fast when it reaches the surface	3	0

Commentary:

This was a difficult task beyond the reach of most year 8 students. There was not a statistically significant difference between GEd (General Education) and MI (Māori Immersion) students.

Te Wai Tōmiti — Disappearing Water

Approach: Station

Focus: Explanation of evaporation and understanding of the water cycle.

Resources: Video showing evaporation with hand fanning and use of a hair dryer.

Questions/instructions:

In this activity you are going to watch a video clip showing people cleaning a blackboard, then answer some questions about what you saw happening in the video.
Watch the video and then answer these questions.
You may replay the video if you need to.

I tēnei mahi e mātakitaki ana koutou i tētahi rīpene ataata poto o ngā tāngata e ūkui ana i te papatuhituhi, kātahi ka whakautu i ngā pātai o ngā mahi i kite koutou.
Mātakitaki i te ataata, ā, ka whakautu i ēnei pātai.
Me whakaatu anō te rīpene ataata mehemea koutou e hiahia ana.

Two squares were marked on the blackboard. One was dried using fanning (left) one was dried using a hair dryer (right).

1. Why did fanning the wet blackboard help it to dry?
   He aha i maroke ai te papatuhituhi i te tāwhiritanga?

	% responses GEd	MI
fanning moves moist air away from the blackboard to allow more to evaporate	0	0
mentions wind and/or water vapour and/or evaporation	9	12
mentions wind or air movement only	63	79

2. The hairdrier uses heat as well as fanning. Why did the heat dry the blackboard faster?
   He mahana, he tāwhiri ngā whakamahinga o te whakamaroke makawe. He aha i tere ake ai te maroke o te papatuhituhi i te mahana?

mentions increased warmth helping evaporation	50	34

3. Where does the water go as the blackboard dries?
   Ka tōmiti te wai ki hea i te wā e maroke haere ana te papatuhituhi?

evaporation or equivalent (eg. "into the air")	50	40

4. Now think about a puddle on the footpath. Where does the water go when the puddle dries out?
   Nā, whakaaro ki tētahi hōpuapua i te ara hīkoi. Ka ngaro te wai ki hea ina tōmiti ai te hōpuapua?

	% responses GEd	MI
both in to the air and the ground	9	2
into the air/sky	46	40
into the ground	30	30

5. The water that falls as rain in one place may come from another place that is far away. Explain how this happens. You can draw a diagram with labels to help explain your answer.
   Tērā pea ko te ua o tētahi wāhi i puta kē mai i tētahi wāhi pāmamao. Whakamāramatia he aha i pēnā ai? Tāngia he hoahoa, me ōna tapa, hei whakamārama i tō whakautu.

Includes all three aspects: water evaporation from source, cloud movement, rain falling elsewhere — GEd 10, MI 14

Commentary:

Overall, the performances of GEd (General Education) and MI (Māori Immersion) students were not statistically significantly different.

Ngā Matire — Rods

Approach: One to one

Focus: Predict and investigate the heat conductivity of different materials, and explain practical applications.

Resources: 5 rods, picture of saucepan, , timer, mug, paper towel, water (boiling), electric jug.

Questions/instructions:

In this activity you are going to find out and tell me about how quickly different materials let heat through them.

Show student the rods as you name them.

1. Here are 5 rods.They are made of wood, perspex, copper, steel and aluminium.
   I am going to put them into this cup then pour in boiling water. Then I will get you to touch the end of each rod to find out how much heat they are letting through.

2. But before we start, can you tell me which rod you think will let the heat move through most quickly?

I tēnei mahi ka whakamātau koe i te tere o te kawe wera a ētahi rauemi, ā, ka whakamārama mai ai ki a au.

Whakaaturia ngā matire ki te ākonga i a koe e whakaingoa haere ana.

1. Anei ētahi matire e rima: kua hangaia ki te rākau, te kiriaku puata [perspex], te konukura [copper], te tīra[steel], me te konumohe [aluminium].
   E kuhua ana e au ki roto i te maka, ka riringi ki te wai wera. Māu e whāwhā ngā tōpito o ia matire kia mātau ai pēhea te nui o te wera kei te kawea.

2. Engari, i mua i te tīmatatanga, ka taea e koe te kī mai ko tēhea te matire tino tere ki te kawe i te wera?

		% responses	
		GEd	**MI**
Prediction for first:	copper	23	23
	aluminium	18	25
	steel	19	30
	perspex	19	9
	wood	21	13

3. Why do you think that rod will let the heat through most quickly? (not marked)

3. He aha koe i whakaaro ai koianā te matire tino tere ki te kawe i te wera? (not marked)

4. Now let's do the experiment.

I am going to pour boiling water into the mug, and I want you to test each rod.

When you test the rods, touch them like this:

Demonstrate how the rods should be touched — *before* the boiling water is added. Demonstrate use of timer.

I will get you to check them every 30 seconds, for two minutes.

With the rods already in the mug, pour boiling water into the mug, and get ready to time the 30 sec intervals.

Repeat the following instruction 4 times (every 30 seconds).

5. Feel each rod now, and tell me what you notice.

After 2 minutes of feel tests:

4. Me whakamātautau ināianei.

E ringihia ana e au he wai wera ki roto i te maka, ā, māu e ārohi ia matire.

Ka ārohi koe i ngā matire, me pēnei te pā.

***I mua* i te ringihanga ki te wai wera, whakaaturia me pēhea te pā atu ki ngā matire. Whakaaturia te whakamahinga o te mata wāti.**

Mō te 2 meneti, me ārohi e koe ia 30 hēkena.

Kua kuhua nei ngā matire ki roto i te maka, ringihia ki te wai wera, ka whakarite ai i ngā wā e toru tekau hēkena.

Hokia anō ngā tohutohu e whai ake nei mō ngā wā e 4 (ia 30 hēkena).

5. Whāwhātia ia matire ināianei, ā, ka kī mai he aha tāu i rongo ai.

Ka taha te 2 meneti o ngā ārohi whāwhā:

6. Now lift each rod out of the water and place them on the table in order, from the one that let the heat through most quickly, to the one that let it through least quickly. Be careful to lift them out with a paper towel so that you don't burn your fingers.

6. Tangohia ake ngā matire i te wai, ka whakatakoto raupapa ki runga i te tēpu, mai i te mea tino tere ake ki te kawe i te wera, ki te mea āhua pōturi. Kia tūpato, me tango ake mā te tauera pepa kei wera o ringaringa.

		% responses GEd	MI
Observations:	copper first	78	85
	aluminium second	69	83
	steel third	76	91
	perspex fourth	76	64
	wood fifth	76	64

7. Materials that let the heat travel through easily are called **good conductors**.
Which rods were good conductors of heat?

7. Ko ngā rauemi hanga noa te kawe wera ka karangatia he **kawenga pai.**
Ko ēhea ngā matire kawenga pai?

copper	96	91
aluminium	94	69
steel	55	32

8. When toffee is made, the ingredients are made very hot, a lot hotter than water. If we had spoons made out of each of these materials, which spoon would be the best for stirring the very hot toffee mixture?

8. Kia mahia he tawhi, ka kōhuatia, kia tino wera, kia wera noa atu i te wai. Mehemea i hangaia ngā koko ki ia rauemi, ko tēhea te koko tino pai hei kōrori i te ranunga tawhi tino wera?

wood and/or perspex	4	2
wood	56	83
perspex	10	6
copper	15	4

9. Why would you use that material?

9. He aha koe i tohu ai ko tēnā rauemi?

not good conductor of heat	60	80

Show student the picture of a saucepan.

The saucepan in this picture is made of stainless steel.It has a copper bottom, and a plastic handle.

10. Why do you think it has a copper bottom?

Whakaaturia te pikitia o te kōhua ki te ākonga.

He kōhua tīra kore waikura tēnei i roto i te pikitia nei. He kapa a raro, he kirihou te kakau.

10. Ki ōu whakaaro: he aha i kapa ai a raro

conducts heat well	81	89

11. Why do you think it has a plastic handle?

11. Ki ōu whakaaro: he aha i kirihou ai te kakau?

conducts heat poorly	94	93

Commentary:

Overall, the results achieved by GEd (General Education) and MI (Māori Immersion) students were not statistically significantly different.

Kiri Huawhenua — Vege Peelings

Approach: One to one

Focus: Evaluate and justify different approaches to organic waste disposal.

Resources: Video showing four ways to dispose of vegetable peelings, 4 photos.

Questions/instructions:

In this activity I want you to think about different ways of getting rid of vegetable waste. We'll start by watching a video.

I tēnei mahi me whakaaro ake koe ki ngā āhuatanga rerekē hei tuku para huawhenua. Tirohia te rīpene ataata.

Show video.

The video showed four different ways of getting rid of some vegetable peelings — put them in a rubbish bag, throw them on a compost heap, put them in a waste disposal unit or feeding them to the animals.

E whā ngā āhuatanga rerekē hei maka para huawhenua i whakaaturia e te rīpene ataata — kuhua ki roto i te pēke para, whiua ki runga pū wairākau [compost heap], kuhua ki roto i te mīhini kanioro [waste disposal unit], whāngaitia rānei ki ngā kararehe.

Show pictures.

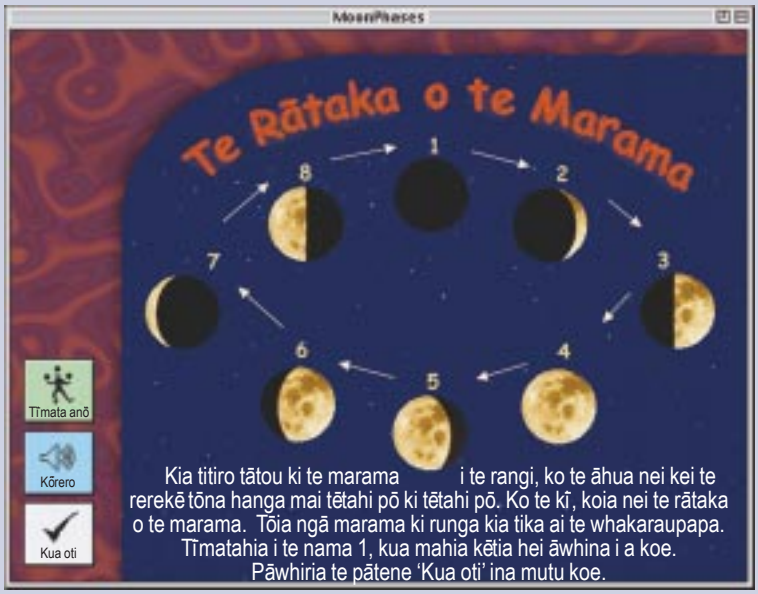
	% responses GEd	MI
1. Which of these ways do you think is a very good way to get rid of the vegetable peelings? Ki ōu whakaaro ko ēhea o ēnei āhuatanga he tino pai mō te maka kiri huawhenua?		
rubbish bag	11	15
compost heap	33	25
waste disposal	10	4
feeding to animals	46	56
2. What happens to the vegetable peelings when you get rid of them in that way? Ka aha ngā kiri huawhenua ki te whiua pērātia?		
3. Why is that a very good way to get rid of the peelings? He aha i tino pai ai tēnei āhuatanga mō te whiu kiri?		
good understanding of process	20	11
some useful idea/s	40	62
4. Which of these ways do you think is **not** a very good way for getting rid of vegetable peelings? Ko ēhea o ēnei āhuatanga **ēhara** i te mahi tino pai mō te whiu kiri huawhenua?		
rubbish bag	40	47
compost heap	25	24
waste disposal unit	31	25
feeding to animals	4	4
5. Why is that **not** a very good way for getting rid of vegetable peelings? He aha i **kore** ai i tino pai tērā āhuatanga mō te maka kiri huawhenua?		
6. What happens to the vegetable peelings when you get rid of them in that way? Ka aha ngā kiri huawhenua ki te makaina pērātia?		
Considerations of immediate and long-term consequences, hygiene, pollution, conservation, convenience, cost.		
good awareness of waste issues	10	9
some awareness	53	53

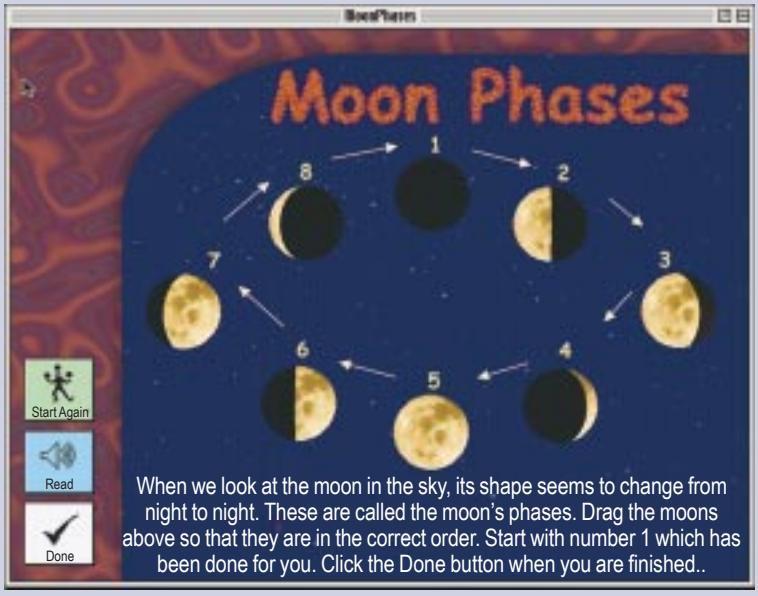
Commentary:

Overall, the results achieved by GEd (General Education) and MI (Māori Immersion) students were not statistically significantly different.

Te Rātaka o te Marama —Phases of the Moon

Approach: Station
Focus: Identify the sequence of phases of the moon.
Resources: Computer, mouse, headphones, mousepad.





Questions/instructions:

This activity is done on the computer.

The computer should show the home page. If it doesn't tell the teacher.

Click on the button that says "Moon".
The computer will tell you what to do

Ka mahia tēnei mahi ki runga rorohiko.

Ko te tikanga ka whakaaturia e te rorohiko te kāinga. Ki te kore, kōrerohia atu i te kaiako.

Pēhia te pātene e kī ana, "Marama".
Mā te rorohiko e tohutohu me aha koe.

	% responses GEd	MI
Placement of 7 phases		
All correct:		
for southern hemisphere	15	16
for northern hemisphere	8	2
One pair inverted:		
for southern hemisphere	2	10
for northern hemisphere	4	2
Other	71	71

Commentary:

The results achieved by GEd (General Education) and MI (Māori Immersion) were not statistically significantly different.

Link Tasks — Science

LINK TASK 2

Approach: One to one
Focus: Explanation of plant features
Resource: 3 pictures, other objects

		% responses GEd	MI
Total score:	10–14	0	0
	8–9	7	9
	6–7	20	21
	4–5	31	31
	2–3	24	33
	0–1	16	6

Commentary:
The results achieved by GEd (General Education) and MI (Māori Immersion) students were not statistically significantly different.

LINK TASK 3

Approach: Station
Focus: Insect features
Resource: Laptop computer, Hypercard® programme

		% responses GEd	MI
Total score:	19–20	10	12
	17–18	16	27
	15–16	37	29
	13–14	20	6
	11–12	5	16
	0–9	8	8

Commentary:
The results achieved by GEd (General Education) and MI (Māori Immersion) students were not statistically significantly different.

LINK TASK 4

Approach: Station
Focus: Animal adaptation
Resource: Picture

		% responses GEd	MI
Total score:	4–5	28	36
	3	39	22
	2	14	20
	1	13	18
	0	6	4

Commentary:
The results achieved by GEd (General Education) and MI (Māori Immersion) students were not statistically significantly different.

LINK TASK 16

Approach: One to one
Focus: Motion
Resource: Not revealed

		% responses GEd	MI
Explanation:	1	8	22
	2	15	21

Commentary:
MI (Māori Immersion) students scored statistically significantly higher than GEd (General Education) students.

LINK TASK 20

Approach: Station
Focus: Chemical tests
Resource: Not revealed

	% responses GEd	MI
Component: 1	68	67
2	60	65
3	72	81
4	91	42
5	58	73
6	28	4
7	4	4
8	52	42

Commentary:
The results achieved by GEd (General Education) and MI (Māori Immersion) students were not statistically significantly different.

LINK TASK 22

Approach: One to one
Focus: Phenomena on earth
Resource: Video

	% responses GEd	MI
Explanation	5	9
Information	49	40
Explanation	4	0

Commentary:
The results achieved by GEd (General Education) and MI (Māori Immersion) students were not statistically significantly different.

LINK TASK 26

Approach: Station
Focus: Phenomena on earth
Resource: Picture

	% responses GEd	MI
Total score: 9–22	0	0
6–8	44	34
3–5	55	58
0–2	1	8

Commentary:
The language in the Māori language version of this task was more difficult than the English. Accordingly, no statistical comparison of the results for GEd (General Education) and MI (Māori Immersion) students is appropriate.