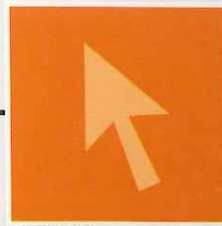


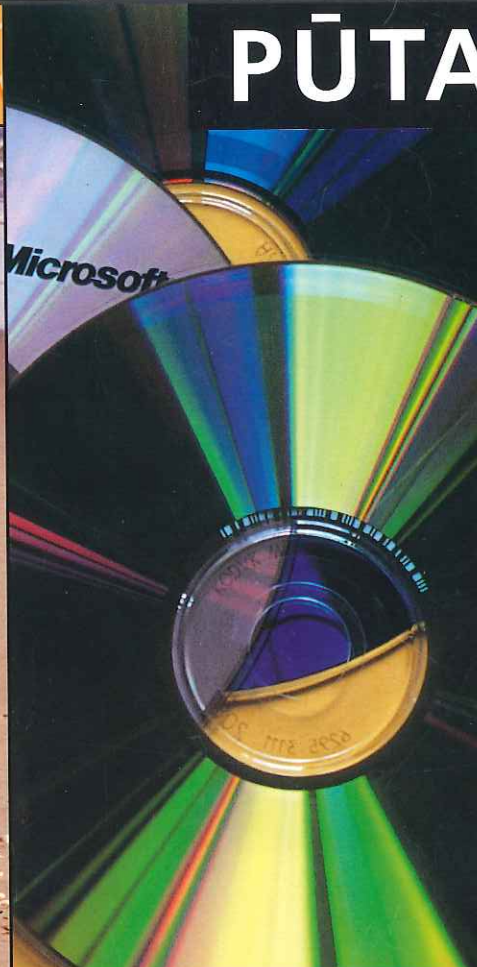
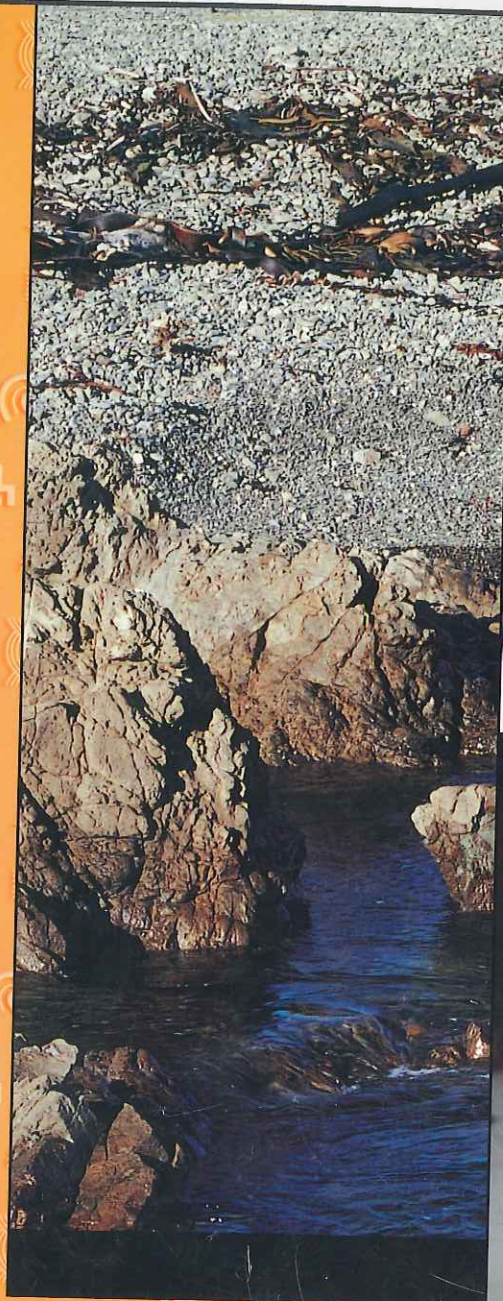
Te Ao Hurihuri 4

He Pukapuka Tohutohu Kaiako



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Te Rea



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Te Ao Hurihuri 4

He Pukapuka
Tohutohu Kaiako

Pūtaiao

Te Rea


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He Mihi

He mihi tēnei ki a Oho Kaa, mō
ōna mahi tino rangatira, i roto i
ngā pukapuka Te Ao Hurihuri
tuatahi, tuarua, me tuatoru mō te
pūtaiao kua whakaputahia e Huia.
Nā tōna tino kaha ki te hāpai i
tēnei kaupapa, ka taea e ō tātou
tamariki mokopuna, ngā kaiako
hoki, te whai i te huarahi o te
mātauranga o te pūtaiao. Nō reira
e kui, tēnā rawa atu koe.

Ko Manu Te Awa te kaietita
ināianeī.

Nā Barry O'Donnell ngā pikitia.

Kotahi te kape kore utu kua
tukuna ki ngā kura waenganui he
karāhe rumaki Māori kei reira.
Mō ngā patapatai, ngā whakaaro
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Ka rāhuitia ngā tika katoa kia āta
whakaaetia rā anō e te hunga kei a
ia te mana tārua.

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Hei Whakapuaki

Ko ēnei pukapuka e rima mā ngā tauira kei te rea e mahi ana. Ko ngā kaupapa kei roto, e pā ana ki ngā whenu e rima o *Pūtaiao i roto i te Marautanga o Aotearoa*. Kotahi, e rua rānei, ngā whāinga akoako o te whenu kei ia pukapuka.

Ō Mataora

E tirotiro ana te pukapuka *Takutai* ki te noho takatū a te mātaaitai.

Ō Ahupūngao

E tirotiro ana te pukapuka *Pūrama* ki te whakaata me ngā momo mahi o te pūrama.

Ō Kawekawe

Ko te pukapuka *Konganuku* e tirotiro ana ki ngā āhuatanga whakarōpū i ngā konganuku me ngā konganuku kore.

Ngā Pūkenga

Ko te pukapuka *Wherawheratia* e tirotiro ana ki ngā pūkenga ki te kohikohi mōhio e hiahiatia ana mō ētahi kaupapa, he tauira, te rerenga o Tama-nui-te-Rā.

Hangarau

Ko te pukapuka *Rorohiko* e tirotiro ana ki ngā whēkau o te rorohiko me te whakamātau me pēhea te mahi o ia wāhanga.

Ētahi Atu Āwhina - He Pukapuka Tohutohu Kaiako

Kei roto anō hoki i tēnei pukapuka ngā pānga ki ngā hononga marautanga, ngā kōrero whānui mō ia kaupapa, ngā whakaaro akoako, ngā whakaaro aro matawai, me ētahi matua kape.

Ō Mataora: Takutai

Te rea

Whāinga Paetae/Achievement Objectives

- 2) tūhura me te whakamārama ngā urutaunga tinana, ngā urutaunga oropi me ngā urutaunga whanonga o ngā rauropi i roto i tō rātou ake taiao (pēnei i ngā pūnaha tinana e whakamahia ana e ngā kararehe hei rapu, hei hopu kai, hei kūnati kai, hei kawē, hei ahotakakame, te rerewai, te tukuwai)
- 2) investigate and describe structural, physiological, and behavioural adaptations which ensure the survival of animals and flowering plants in their environment, e.g., the organ systems which animals use to locate, catch (or harvest), eat, digest, transport, and use food; territoriality; social behaviour; photosynthesis; osmosis; transpiration

Pūtaiao i roto i te Marautanga o Aotearoa whārangi 26; Science in the New Zealand Curriculum page 62.

Hei Mahi Mauria tōu akomanga ki takutai – ki ngā wāhi whai toka, whai kirikiri rānei. Mauria:

- he kākahu mahana
- ētahi hū pai mō te hīkoi i runga i ngā toka
- he pēre, he paepae aihikirīmi
- he karu whakarahi
- he pēke kirihou
- he pouaka tango whakaahua
- he pepa tuhi me ētahi pene rākau.

Mō ēnei momo haerenga, he tika kia haere ētahi atu pakeke ki te awhi i a koe. Me pānui atu ki a rātou ngā momo mahi e mahia ana i takutai i mua i tōu haerenga. (Pēnā e taea, haere atu ki te tiro i te āhua o te wāhi i mua i tōu haerenga atu.) Whakatakotohia ngā ture mō ngā ākonga, me ngā wāhi e whakaaetia ana mō rātou ki te haere. Tukuna ngā ākonga ki te omaoma ki te tutū haere i mua i te tīmatatanga o ngā mahi.

Āta tirohia ngā tupu me ngā kararehe i kitea. Tuhia ngā hanga o ngā tupu me ngā kararehe. Tuhia ō rātou āhuatanga: ngā āhua o ngā rau, e hia ngā waewae, te rahi o te anga. Whakamahia te tārua matua (copymaster) 'Takutai' mō ngā ākonga. E mōhio ana rātou i ngā ingoa o ngā mea nei? Me pēhea e taea e rātou te whakarōpū? (He tauira: ngā waewae – e hia; te tae; i kitea i tēhea wāhi; e tupu ana i hea; te āhua o te anga.)

Mā ngā ākonga e whakaatu kia rima ngā tupu, ngā kararehe rānei, mai i ngā whārangi 4-7 o te pukapuka *Takutai*. Kōrero atu:

- i ngā tikanga e pā ana ki ō rātou mahi i takutai – me waiho tika e rātou, whakahokia ngā kararehe ki ō rātou wāhi noho me ngā kōhatu ki ā rātou takototanga tika, kaua e kato i ngā rau rimurimu me ngā tupu mai i ngā toka, ko tēnei haerenga he haere tirohanga, ehara ki te kohikohi kaimoana
- he aha ngā kai o ēnei kararehe?
- ko wai, ko te aha, e kai ana i a rātou?
- me pēhea rātou e nekeneke haere ai?
- me pēhea rātou i takatū ai ki te noho i takutai?

Whakaatuhia te tai pari, te tai timu. Whakaatuhia ngā rohe o ngā tai. Tāhia he huahuatanga o ngā momo rohe o te wāhi i tirohia e rātou. Ko tēhea te hau pūmau o tēnei wāhi?

I roto i te tapawhā ōrite, kotahi mita te nui, kautehia ngā kararehe i kitea. E taea e rātou te whakaaro, e hia ngā momo kararehe i takutai? Kauwhatahia ngā hua.

Kōrerorerotia ngā nekenekenga o ngā tai. Hoatua te tārua matua 'Ngā Tai' ki ngā ākonga.

He Tauira Aro Matawai

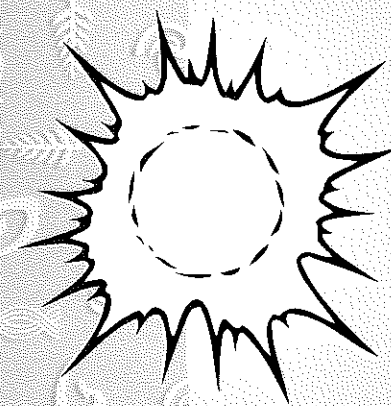
E kitea ai te kaha o te ākonga ki te:

- tāutu me te whakahāngai i ngā āhua e noho ora ai te pāpaka ki takutai, i roto i ō rātou tuhinga
- raupapa me te whakaatu mai i ō rātou kitenga me ngā ine mai i ngā kauwhata i tuhia e rātou.

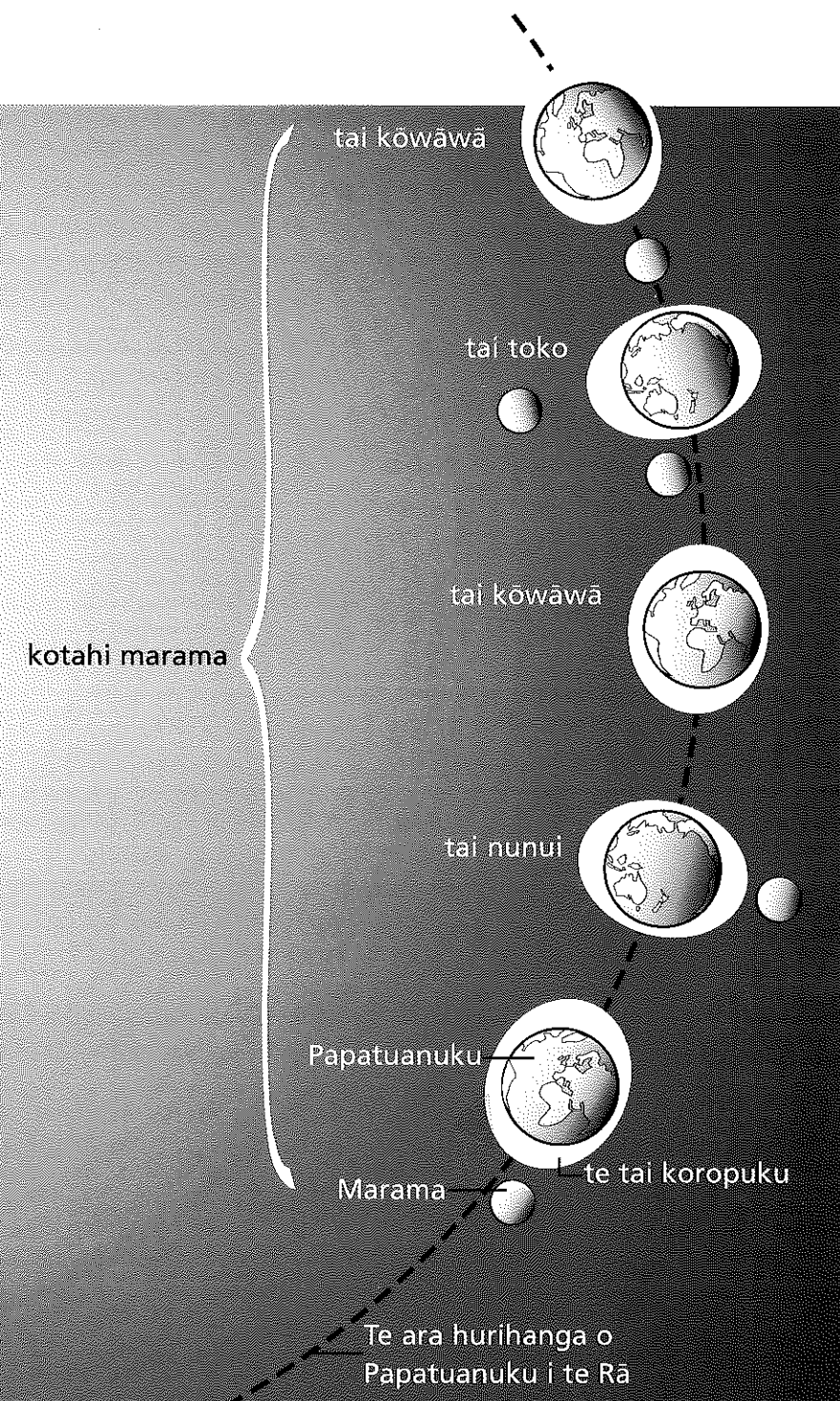
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Kararehe/tupu	Nō hea?	Te āhua	Tauira/whakaahua

n g ā t a i



Tama-nui-te-Rā



Kotahi takahuringa o te Marama i Papatuanuku mō ia marama.

Ō Ahupūngao: Pūrama

Te rea

Whāinga Paetae/Achievement Objectives

- 2) hanga tūhura ā-ringa, me te whakahaere taurangi mō ngā putaputa āhua e mōhio whānuitia ana me te whakapā atu i ngā kitenga ki ngā whakaaro pūtaiao (pēnei i te whakaata me te ata pikopiko)
- 5) tūhura me pēhea te whakamahi i te pūrere ahupūngao, i te pūnahanaha ahupūngao rānei ki tētahi āheinga motuhake (pēnei i te whāhutahi whakaputa rama hei tohu i te aukati, i te tuku o te iahiko)
- 1) carry out simple practical investigations, with control of variables, into common physical phenomena, and relate their findings to scientific ideas, e.g., reflection/refraction
- 4) investigate how physical devices or systems can be used to perform specified functions, e.g., light-emitting diodes as off/on indicators

Pūtaiao i roto i te Marautanga o Aotearoa whārangi 44; Science in the New Zealand Curriculum page 80.

Hei Mahi

Pēnā ka taea, haere atu ki te titiro ki tētahi whare whakaata pounamu (hall of mirrors). Tuhia ngā hihi o ngā pūrama e whakaata mai ana i te whakaata pounamu.

Mahia ngā whakamātauranga mai i te pukapuka *Pūrama*.

Āta tirohia ngā arotahi hakoko me te koropuku (converging lenses, diverging lenses). Whakaritea ngā mahi mai i te tārua matua 'Arotahi'.

E taea e koe te hoko mai i ētahi pūrere taiaho tohu (laser pointer), ngāwari nei te utu, mai i te Warehouse. Mā ngā ākonga e whakaatu me pēhea ēnei mea ka mahi. (Titiro ki te whārangi 11 o te pukapuka *Pūrama*.) Tuhia ō rātou kitenga.

Whakaritea ngā mahi mai i te tārua matua 'Pūrama' kia kitea i pēhea ai i puta mai ngā pūrama mahea (clear light), mai i te pūrama tae.

Whakaatuhia te rama, arā ngā ngaru e kitea e tātou, mai i te ngaru autō-a-hiko i ngā whārangi 6-7 o te pukapuka *Pūrama*. Ka kite atu rātou i ngā ngaru ngaruiti e rīpoi haere ana? Pēhea ngā ngaru whakaata roto (X-rays)? Ka kitea? Ka kitea te pikitia i mahia e rātou rānei?

Whakamātautauria te whakaata o te rama mai i te pounamu whakaata. Titiro atu ki te huahuatanga i te kokonga o runga o te whārangi 10 o te pukapuka *Pūrama*. E whakaata ana ngā rama mai i te pounamu whakaata. Ki ō tātou karu, te āhua nei kei roto kē te mea e whakaata ana i te pounamu.

He Tauira Aro Matawai

E taea e te kaiako te mātau i ngā mōhiotanga o ngā ākonga e pā ana ki te pūrere taiaho tohu (laser pointers), mai i ō rātou tuhituhinga.

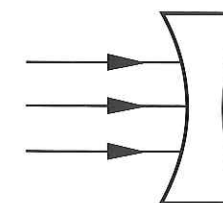
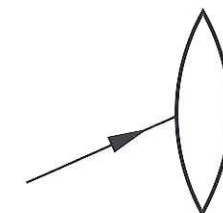
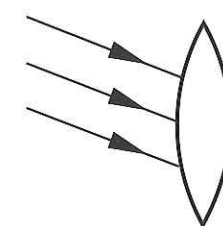
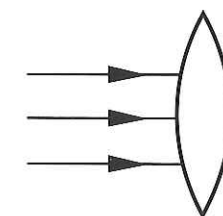
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Te kaupapa o taku mahi: te āta titiro ki ngā arotahi hakoko me te koropuku.

Ngā rawa i whakamahia: rama, arotahi.

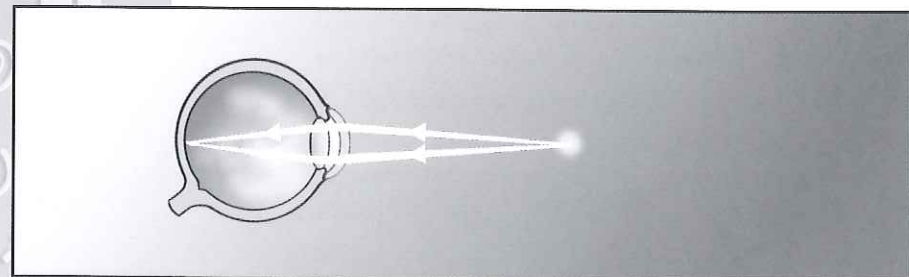
I pēheatia e au?

He aha ngā hua o aku mahi?

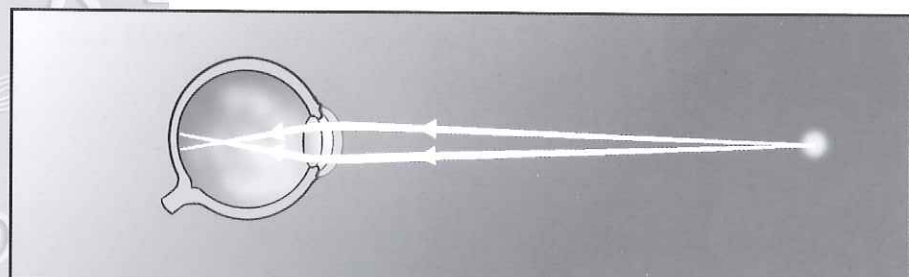


mōhiti

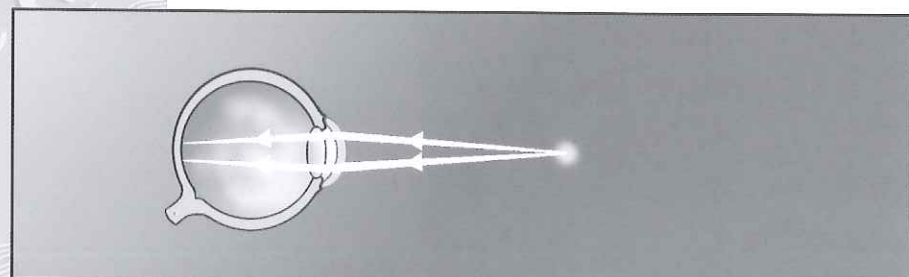
kanohi kite



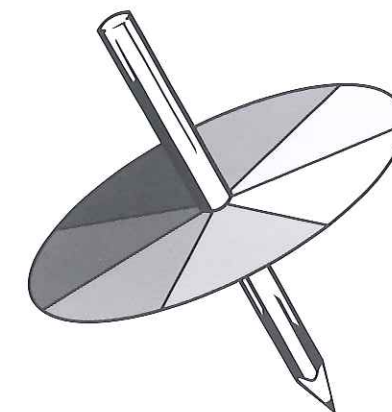
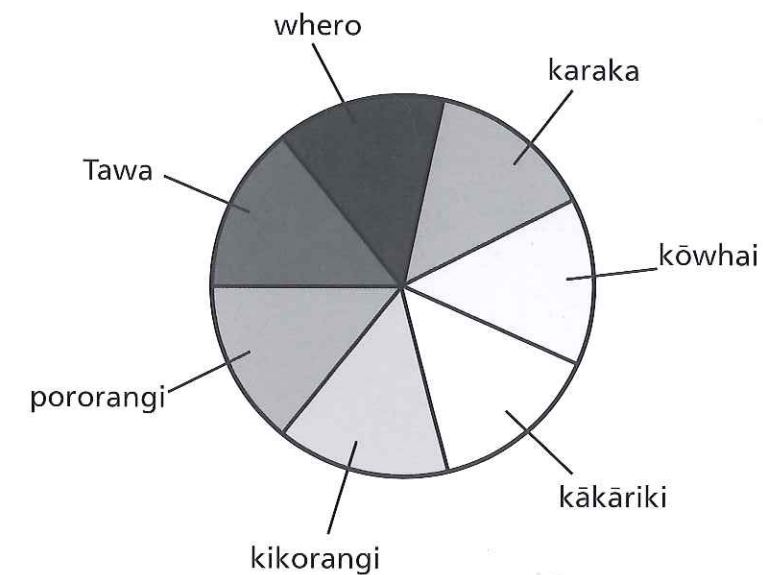
kanohi kākāpō



kanohi kāhu



pūrama



- Tuhia he porowhita me ōna wehenga e whitu ki runga i tētahi kāri ngātahi.
- Tapahia te porowhita.
- Peitahia ngā wehenga e whitu ki ngā tae o te āniwaniwa.
- Purua he pene rākau koi ki te kōwhao kia rite ki te pōtaka.
- Huri teretia. Ki te tino tere te huri o tōu pōtaka ka ngaro atu ngā tae. He aha ai?

Ō Kawekawe: Konganuku

Te rea

Whāinga Paetae/Achievement Objectives

- 1b) whakawehe te rerenga kētanga o ngā pūmotu i ngā pūhui, i ngā ranunga, mā ngā āhuatanga ōkiko me ngā āhuatanga matū me te whakamārama i tētahi tauira māmā o te ngota
- 3) tūhura ētahi tū momo matū e mōhio whānuitia ana me ngā paheko matū i roto i ngā āhuatanga o ia rā (pēnei i ngā konganuku)
- 1b) distinguish between elements, compounds, and mixtures, using simple chemical and physical properties, and describe a simple model of the atom
- 3) investigate some important types of substances and the way they change chemically in everyday situations, e.g., metals

Pūtaiao i roto i te Marautanga o Aotearoa whārangi 62; Science in the New Zealand Curriculum page 98.

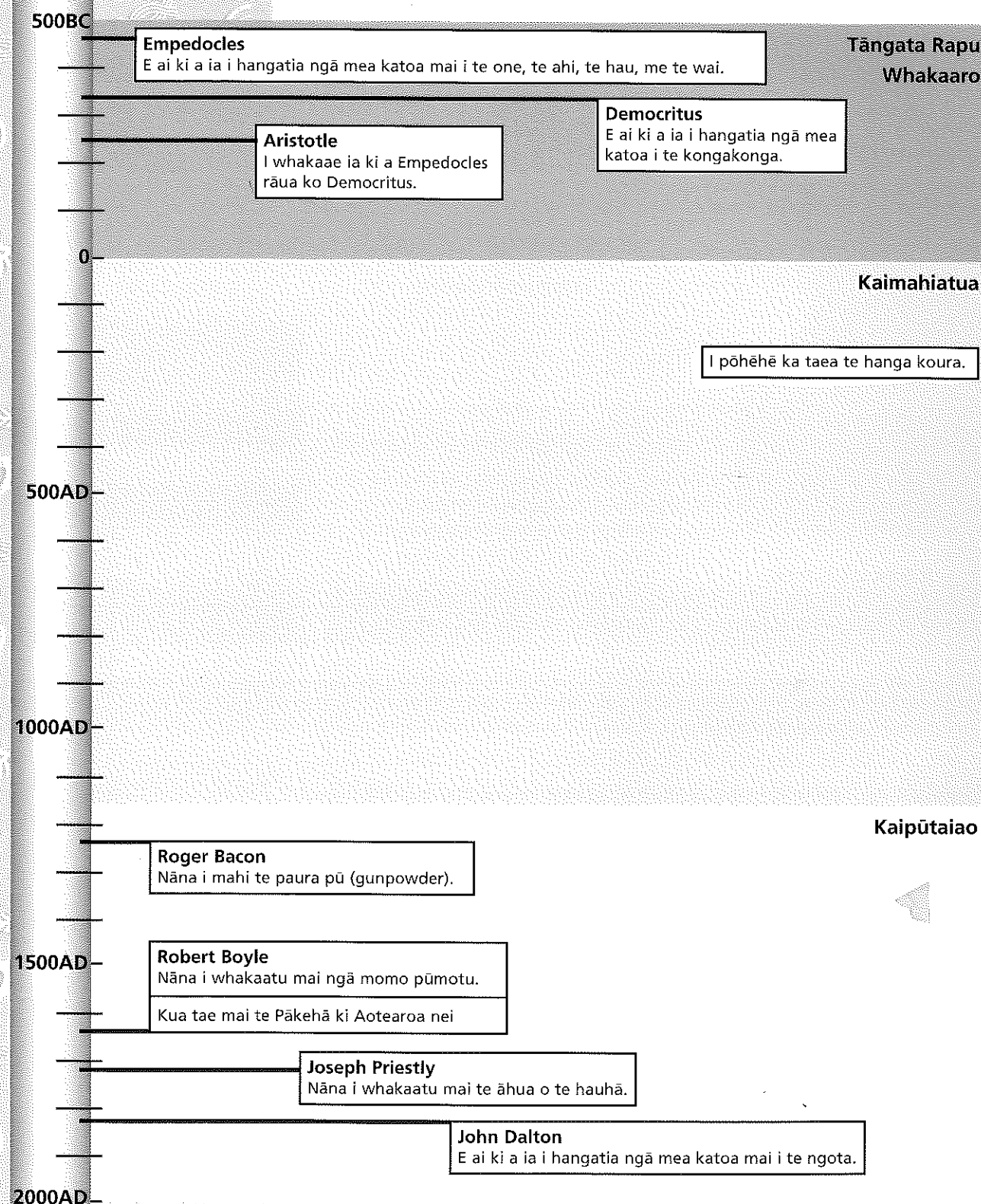
Hei Mahi Mahia ngā whakamātauranga mai i te pukapuka *Konganuku*.

Aratakitia ētahi whakamātautau mai i ngā mea i roto i ngā paepae pene o ngā ākonga. He konganuku? He konganuku kore rānei? He tauira, whakamahia te aukume (magnet) hei wehe i ngā mea e rapa ana me ngā mea kāhore e rapa ana. He tauira anō, e taea e ēnei mea te kawehiko? Titiro ki te pukapuka *Hiko*.

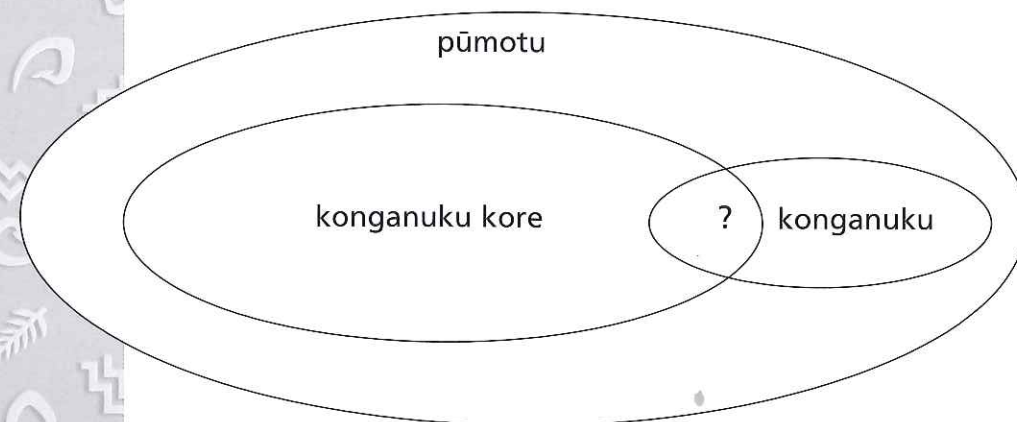
Kōrerorerotia te whakapapa o te mātauranga matū (Western science study of chemistry). He aha ai ngā tāngata o mua i pōhēhē e taea e rātou te hanga koura (gold)? E tino mōhio ana ngā kaipūtaiao ki ngā putanga o ā rātou mahi, ka ohore rānei? Whakamahia te tārua matua 'Te Mātauranga Matū'.

He Tauira Aro Matawai E kitea ai te kaha o te ākonga ki te whakamārama i ngā wehenga o ngā pūmotu ki roto i ngā rōpū whānui e rua o te Taka Pūmotu, me tohu e ia te wāhi ki ngā konganuku, ki ngā konganuku kore hoki.

t e m ā t a u r a n g a m a t ū



k o n g a n u k u
k o n g a n u k u k o r e



ingoa o te mea:	ae	kao
te pūkawe wera?		
te pūkawe hiko?		
he pūoro – ka tangi ki te hauhaua?		
he kōngohe – e taea te whakamākohe?		
he māngohe – e taea te takapapa?		
he kanapa?	pātata	kao
te wā rewā	kaha	iti
he konganuku?	ae	kao
		aua

Pūkenga: Wherawheratia

Te rea

Whāinga Paetae/Achievement Objectives

Te Kohikohi Mōhio: te whiriwhiri, ki te whakamahi taputapu ine kia taea ai te mahi mātakitaki me te ine tātai, ine kōunga hoki, ā, kia hāngai, kia tino tika; te āta tuhi i tāna i mātakitaki ai, i ine ai, ā, kia pūnahanaha hoki; te kimi mōhio mai i ngā rorohiko, i ngā kuputohu me ngā whakarārangi aha noa

Information Gathering: select and use measuring instruments to make qualitative and quantitative observations and standard measurements with appropriate precision; systematically record observations and measurements; locate information through catalogues, indexes, and computers

Pūtaiao i roto i te Marautanga o Aotearoa whārangi 75; Science in the New Zealand Curriculum page 45.

Ō Ahupūngao Wherawheratia

Te rea

Whāinga Paetae/Achievement Objectives

- 1a) whakamahi ētahi pūrere hangarau pēnei i te karu whātata me te mahere tātai whetū hei mātakitaki, hei whakaahua hoki i ngā huringa o Rangi-nui (pēnei i ngā āwhiotanga o te Marama, i te nohonga o Te Taki o Autahi)
- 1b) whakamahi ngā kōrero e haramai nei i ngā pūrere hangarau pēnei i te pūkahi hihirangi me ngā aorangi hori hei whakaihihi, hei whakawhānui i ngā whakaaro e pā ana ki ngā āhuatanga o ngā mea o Rangi-nui e pātata nei, e matara ana hoki (pēnei i te waihanga, i te rahi i te mata o papa, i te huarere; i ngā whetū, i te marama o Papa-tū-ā-nuku, i ngā aorangi, arā, te puaroa, te kōtiri, te tātai whetū, te ikarangi; āe rānei ka ora tētahi mea, kāore rānei)
- 3a) use simple technological devices, such as telescopes and simple star maps, to observe and describe changing patterns in our night sky, e.g., position of the Moon, orientation of the Southern Cross
- 3b) use information obtained from technological devices, such as radio telescopes and satellites, to clarify, challenge, and extend their ideas about the general characteristics of some near and far space objects, e.g. structure, size, surface landscape, climate; the Sun and other stars, Earth's Moon, planets, comets, meteors, clusters, galaxies; feasibility of life

Pūtaiao i roto i te Marautanga o Aotearoa whārangi 44; Science in the New Zealand Curriculum (Making Sense of Planet Earth and Beyond) page 116.

Hei Mahi Mahia ngā whakamātauranga mai i te pukapuka *Wherawheratia*.

Tuhia ngā ātārangi o ngā mea e tū ana i te kura, pērā i te whare hui, ngā pou poi tarawhiti, pou haki, i te wā e whiti ana te rā. Inea ngā ātārangi. E pēhea ai te rerekē atu o te roa me te poto o ngā ātārangi? Whakamahia te tārua matua 'Te Ātārangi'.

Mahia he mahere o te rā me ngā whetū ao. He aha ngā whakaaro o ngā ākomanga o tōu kura mō tēnei mahere?

Mahia ngā mahi o te tārua matua 'Tama Nui te Rā'.

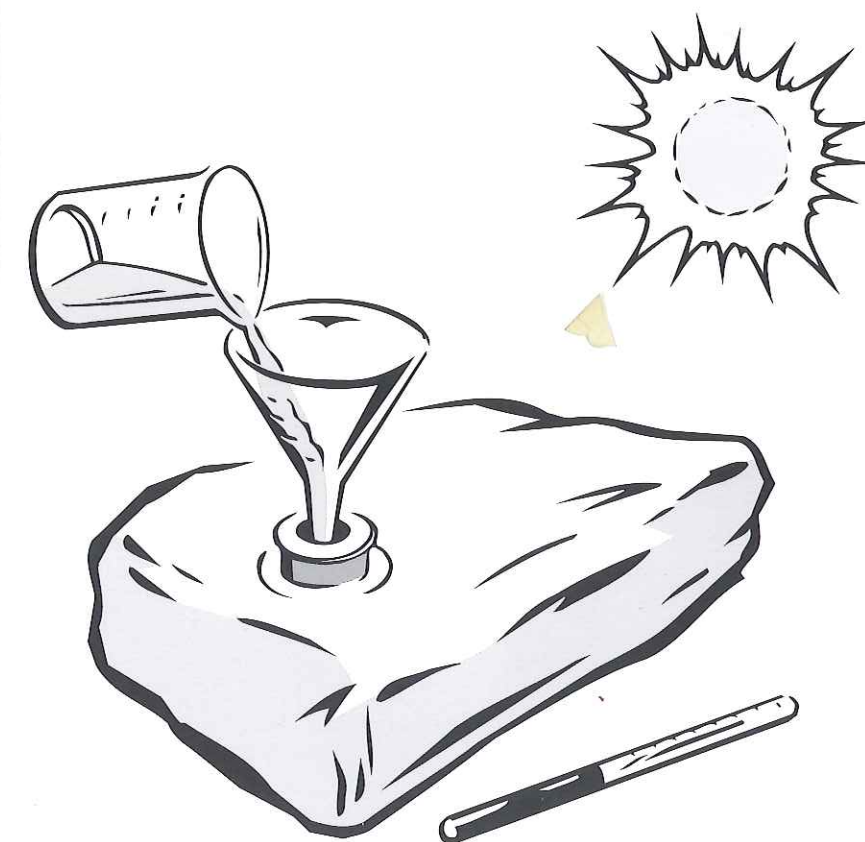
He Tauira Aro Matawai E kitea ai te kaha me te mōhio o te ākonga ki te rangahau. Me kimi e ia ngā whakaaro a ngā tāngata i haere mai ki te kite i te mutunga o ngā mahi.

E kitea te kaha o te ākonga ki te pohewa i te hanganga o te rerenga o Tama Nui te Rā i ngā takotoranga o ngā aorangi i runga i ō rātou mahere wātea.

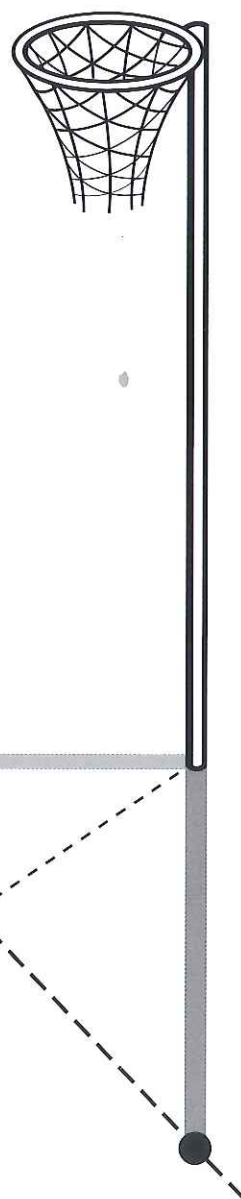
Tama Nui te Rā

- Tangohia te paepae kirihou o te pouaka waina, wai reka rānei kua pau te inu. Tapahia te kōrere putanga.
- Whakakīia ki te rua rita wai.
- Inea te mahana o te wai i roto.
- Waihotia ki roto i te Rā mō te tekau mā rima mēneti. Inea anō te wai o roto.
- Pēhea te mahana o te wai ināianei?

E 8,400 Hūra ki te hiki i te mahana o te rua rita te 1° C. Ka taea e koe te mātau e hia ngā Hūra o Tama Nui te Rā ki te whakamahana i te wai i roto i te paepae waina?



t e ā t ā r a n g i



Hangarau: Rorohiko

Te rea

Whāinga Paetae/Achievement Objectives

- 1a) whakarite āna whakamāoritanga e puta ake ana i āna tūhura, ki ngā whakaaro, ki ngā pātai, me ngā matapaenga i whakaarohia i te tuatahi
- 3) tūhura te mōhiotanga pūtaiao me te hangarau e whakamahia ana e te tangata ia rā
- 1a) relate interpretations of the result of their investigations to their original ideas, questions, and predictions
- 3) investigate how knowledge of science and technology is used by people in their everyday life

Pūtaiao i roto i te Marautanga o Aotearoa whārangi 96; Science in the New Zealand Curriculum page 34.

Hei Mahi Kōrerotia ngā mea e pā ana ki te rorohiko. Me pēhea ka mahi? Tāhia he huahuatanga kia kitea ai ō rātou whakaaro, he aha kei roto i te tinana o te rorohiko. Tuhia ngā whakaaro e pēhea ai te rorohiko ka mahi.

Mahia ngā mahi i roto i te pukapuka *Rorohiko*.

Pēnā e taea e koe, kōrero atu ki tētahi tangata e whai kāinga ana i runga i te ipurangi (internet). I pēhea ka tū tēnei kāinga?

Tāhia anō he huahuatanga ki te whakamārama ka pēhea rā ka mahi te rorohiko. Whakamahia te tārua matua 'Kei te pēhea te haere o ngā mahi?' ki te mātau i ō rātou anō huahuatanga. He aha ngā mea hou i ako ai rātou?

He Tauira Aro Matawai E kitea ai te kaha o te ākonga ki te mātau i ōna anō mahi i a ia e mahi ana i te tārua matua 'Kei te pēhea te haere o ngā mahi'.

k e i t e p ē h e a t e
h a e r e o n g ā m a h i ?

Tō ingoa

Taumata

Te rā

Te kaupapa

Kaiako

Pātai

Tauira

Tuhia kia whā ngā mea tino whai painga i
akona e koe mō te rorohiko.

Ko ēhea ngā wāhi kei te pīrangi koe kia
āwhinatia koe?

He aha tō whakaaro ki tēnei kaupapa i
tēnei wā tonu? (Anei ētahi kupu:
mārama, ngāwari, āhua pai, pōraru,
māharahara.)

He aha te mea kei te whakararuraru i
ōu mahi i tēnei wā?

Me pēhea e pai ake te whakamārama
i tēnei kaupapa?

Ngā Kupu

arotahi	lens	kongakonga	particles
arotahi hāhako	converging lens, convex lens	konganuku	metal
arotahi koropuku	diverging lens, concave lens	konganuku kore	non-metal
autō-a-hiko	electromagnetic	kōngohe	ductile (pliable)
		konukura	copper
hākoko	reflect (light)	kōpaepae tūoro	CD, CD-ROM, compact disk
hangarau	technology	koranu	alloy
hāora	oxygen	koringo	pupil (of eye)
hauhā	carbon dioxide	kotakota ngū	ram's horn shell
haukino	carbon monoxide	kōtore	anemone
haumāmā	helium	kōtuitui rorohiko	computer network
hauwai	hydrogen	kuku	mussel
hihi pōkākā	infrared rays		
hōnea kore	black hole (in space)	māngohe	malleable (able to be hammered out)
Hūra	Joules	mata rorohiko	computer screen
		mata tūroa	retina
io whatu	optic nerve	maurea	tiger shell
ipurangi	internet	moana kōkā	motherboard (of a computer)
irahiko	electron, pixel	moenga rauwhero	sun bed
ira kōpū kaitā	dot matrix printer		
		ngāeo	dark rock shell
kaikaikaroro	triangle shell	ngākihi	limpet
kaimahiatua	alchemist	ngaruiti	microwave
kāinga ipurangi	internet sites, websites		
kapu parahua	cushion star	pahū uruhanga	nuclear explosion
karoro	black backed gull, purple cockle	pāngarau	mathematics
karu whakatata, karu whātata	telescope	pāpaka	crab, rock crab
kāunga	hermit crab	pāpaka huna	camouflage crab
kaupane rorohiko	computer monitor, visual display unit, VDU (data display screen)	papatai	turret shell
kāwari	whelk	papatua	chiton
kawe	conduct (carry heat or electricity)	Pareārau	Jupiter
kawekawe	half-crab	pātangaroa	starfish
kēkeno	seal	poro	prism
kina	sea urchin	Pou o te Rangi	Southern Celestial Pole
kiore rorohiko	computer mouse	pū	tube
kōkopu	cockabully	pūkawe	conduct (carry heat or electricity)
		pūmotu	element (of Periodic Table)

pūnahi parakaingaki
 pūngao
 pūngao pūrama
 pūoro
 pupumai
 pūrama
 pūrere
 pūwhakahuri

rama mahea
 rimurapa
 rorohiko
 rorohiko matua
 roromahi

tā taiaho
 taiaho
 tai kōwāwā
 tai toko
 takatai
 tarapunga
 Te Ika Roa

sewage treatment
 energy
 photon (a unit of light energy)
 sound, sonorous
 topshell
 light
 machine
 modem

clear light, white light
 kelp
 computer
 mainframe computer
 central processing unit, CPU (of a computer)

laser printer
 laser (light)
 neap tide
 spring tide
 abacus
 red billed gull
 the Milky Way

tio
 tio para
 tīpā
 toruwae
 totorere
 tuhinga poupou

ukanga

weki
 whakaata
 whakaata pounamu
 whakaata roto
 whakaaturanga
 whakatūhoi
 whanotanga

Whānui
 whetū ao
 Whetū Raki

rock oyster
 oyster
 queen scallop
 tripod
 ostrich foot
 barcode

density

brittlestar
 reflect
 mirror
 X-ray
 computer program
 refract (bend light)
 behaviour, property (of a substance or thing)
 Vega (a star)
 planet
 Northern Star