



Nō Hea Koe, Ko Wai Koe?



He Kōpaki Hangarau - Taumata 1

He rauemi hei ako i te Hangarau i te taumata 6 o
Te Marautanga o Aotearoa, i te taumata 1 hoki o NCEA.

He Mihi

He mihi tēnei ki a koutou, e ngā ākonga, e hāpai ana i te reo rangatira. Tēnā koutou katoa.
Kei roto i tēnei huinga rauemi tētahi kōpae ataata, tētahi kōpae hikohiko, ngā pukapuka e rima mā ngā ākonga, me tētahi pukapuka hei āwhina i ngā pouako rātou ko ngā ākonga e whai ana i te ara hangarau.

He mihi tēnei ki ērā mātanga hangarau katoa nā rātou i whai wā ki te āwhina, ki te tautoko i a mātou i te hanganga o tēnei rauemi. Kua aro hoki mātou ki ētahi pepa kua whakaputaina e Te Tāhuhu o te Mātauranga hei āwhina, hei tautoko i ngā kura, i ngā kaiako ki te whakaako i te marautanga hangarau. Ka taea e te katoa te aro atu ki ēnei pepa kei te Ipurangi kei te paetukutuku *Techlink*.
Kei www.techlink.org.nz/curriculum-support/links.htm te ara toro atu.

Nā Pauline Waiti ngā kōrero mō te mātaitanga i tēnei pukapuka.
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He Kōpaki Hangarau Taumata 1

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I hangaia tēnei rauemi hei tautoko i
Te Marautanga o Aotearoa



Nō Hea Koe, Ko Wai Koe?

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Te Whakamahi i Tēnei Rauemi

Te whāinga

Māu tēnei pukapuka, arā, mā ngā ākonga e whai ana i te Hangarau i tētahi akoranga o te taumata 6 o te wāhanga ako hangarau o *Te Marautanga o Aotearoa*. Ko te nuinga o ēnei ākonga kei te tau 11, engari kua te katoa.

Koinei tētahi o ngā pukapuka e rima mā ngā ākonga, he kōpae ataata, he kōpae hikohiko anō e haere ana i te taha. Kia noho tēnei hei tūāpapa mō ētahi akoranga hangarau kotahi tau te roa.

Anei ngā ingoa o ngā pukapuka:

1. Te Whare Tautaiāo, Tū Ana, Tau Ana
2. He Taonga Tonu te Rāpihi
3. **Nō Hea Koe, Ko Wai Koe?**
4. He Kai Kei Aku Ringa
5. Te Kaha o te Hau

Ko te ingoa o te kōpae ataata, ko He Kōpaki Hangarau Taumata 1. E rima ngā mātaitanga e whakaataria ana ki te kōpae, ko tētahi mō tēnā, mō tēnā o ngā pukapuka e rima.

E whakamahia ana te kupu mātaitanga i konei hei whakaahua i te tirohanga hōhonu ki tētahi āhuatanga koia e whakaahua ana, e whakatauiria ana i tētahi kaupapa whānui e arotahia ana.

Mā te kaiako koe e ārahi ki te āta wherawhera i te pukapuka nei me te kōpae ataata.

He maha ngā wāhanga o te pukapuka. Ka whakamāramatia takitahitia tēnā me tēnā:

- Te Mātaitanga
- Te Marautanga o Aotearoa
- Te Whakawhanaketanga o te Otinga Hangarau
- Te Anga Whakaū Māramatanga ki te Tukanga Hangarau
- Te Whakaharatau Hangarau
- Ngā Āhuatanga Hangarau
- Te Aromatawai

Te mātaitanga

Kua tū mai te mātaitanga kia kite ai, kia whāwhā ai koe, te ākonga, i ētahi tauria tūturu o ngā whakaharatau hangarau – o neherā, o nāianeī anō hoki. Ka whakaaturia ētahi āhuatanga o te tukanga hangarau i roto i ngā mahi whakaharatau hangarau o te mātaitanga. Nā te āhua tonu o te whakaharatau hangarau, kāore tonu pea koe e whai wā, e whai rānei i ngā rawa e taea ai ēnei mahi te kawhe ake i te kura. Engari mā te mātaitanga ka kite wheako koe i ngā mahi e mahia ana, me ētahi mahi iti ake e āhua rite ana ka taea te kawhe i te kura.

E hāngai pū ana te mātaītanga i tēnei pukapuka ki ngā kōrero o te mātaītanga i te kōpae ataata, engari he paku rerekē ngā kōrero.

Ka kapi i ia mātaītanga tētahi, ētahi rānei o ngā Aho (ngā wāhanga hangarau) e rārangi iho nei:

- Hangarau Koiora
- Te Tuku Mōhiotanga
- Ngā Hanga me ngā Pūhanga Manawa
- Te Tāhiko me te Hangarau Whakatinā
- Hangarau Kai

He anga e mārama ai te tukanga hangarau

Ko te anga nei hei arataki i a kōrua ko te kaiako, kia mārama ai kōrua ki te tukanga hangarau. E whakaahua ana te anga i ngā takahanga katoa o te tukanga hangarau, e whakaatu ana anō hoki i ētahi tauira o ēnei kei roto i te mātaītanga.

Kei te whārangi 15 tētahi hoahoa e whakaatu ana i ngā wāhanga katoa o te tukanga hangarau, ā, ko ēhea wāhanga ka taka ki raro i Ngā Āhuatanga Matua o te Hangarau, ko ēhea wāhanga kei Te Whakaharatau Hangarau.

I ngā whārangi 17–29 e āta whakamāramatia ana ngā tauira o roto mai i te mātaītanga e hāngai ana ki tēnā takahanga, ki tēnā takahanga o te tukanga hangarau.

Ā te mutunga o ngā wāhanga “Te Whakaharatau Hangarau” me “Ngā Āhuatanga Hangarau”, tirohia anō te hoahoa kei whārangi 13. Tāruatia te hoahoa kātahi ka tohu mai mēnā kua kitea e koe he tauira o ia wāhanga mai i te mātaītanga. Mēnā āe, e tohu ana tēnei kua mau i a koe ētahi mōhiotanga ki ngā takahanga katoa o te tukanga hangarau.

Te aromatawai – he aromatawai i te tukanga hangarau me te whakamahi anō i ngā paerewa paetae

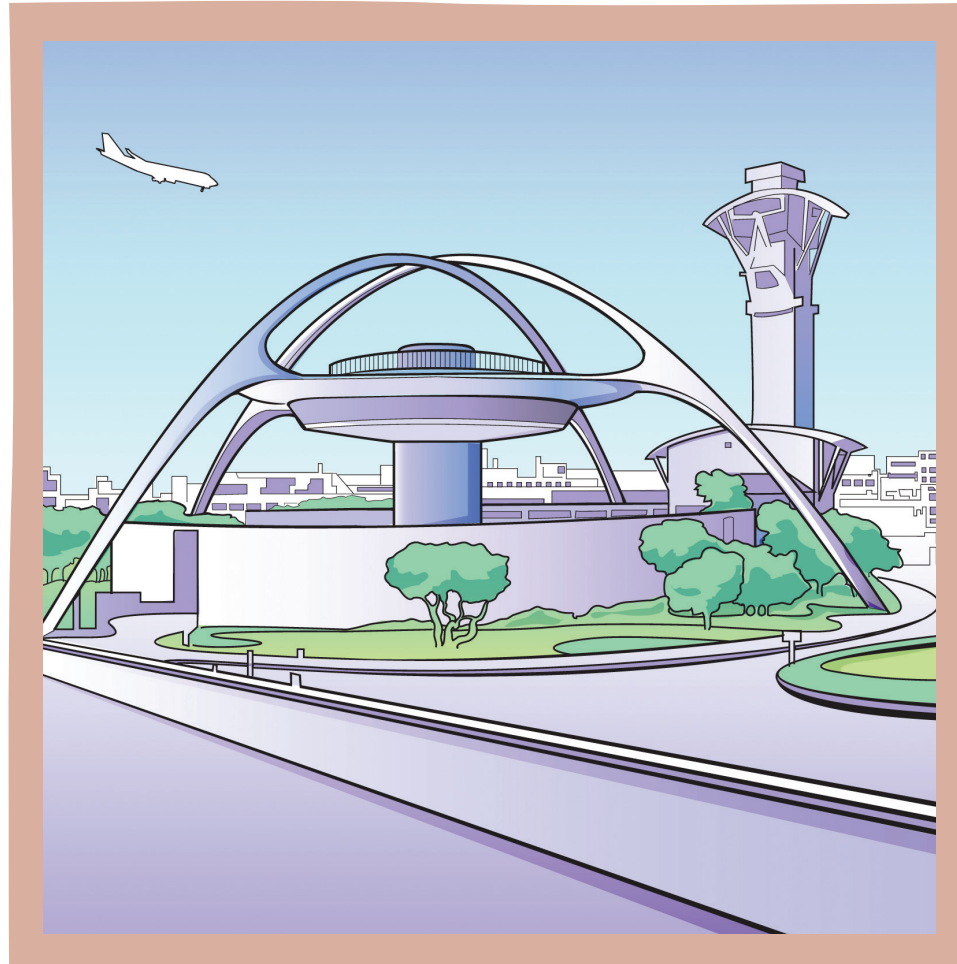
Ko tā tēnei wāhanga, he āta whakaatu me pēhea te whakamahi i ngā whāinga paetae hei aromatawai i te mōhio o te ākonga ki ētahi āhuatanga o te tukanga hangarau. Kei konei anō tētahi tauaromahi me ōna anō kupu whakamārama, e hāngai ana ki tētahi whāinga paetae. E whakaahuatia ana ngā paearu, kua takoto anō he whakamārama mō ngā mahi kia mahia, e kīia ai āe, kua tutuki te whāinga.

Ko te tukanga hangarau e arotahia ana i tēnei wāhanga, ko tērā kei te mātaītanga. E whakamahia ana i konei kia āta kite ai koe ka pēhea tō aromatawainga tūturu.

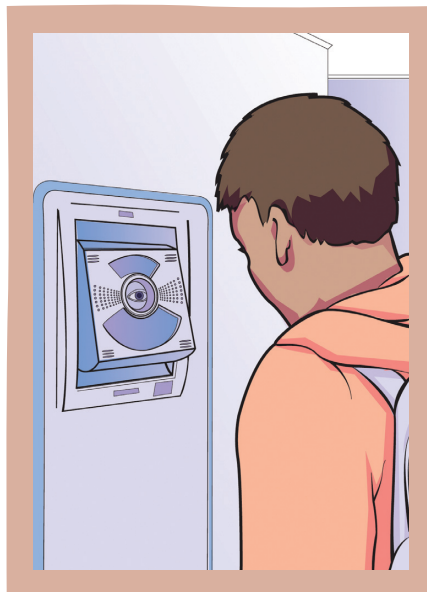
Te Mātaaitanga – Nō Hea Koe, Ko Wai Koe?

He aha te hāngaitanga o te whakaahua i tō karu ki ō whakapapa?

He kōrero



I haere te whānau Makoare ki tāwāhi, ki Ngā Whenua Tōpū o Amerika, ki te toro i ō rātou whanaunga kua whā tau e noho ana i reira. I whakaaro te whānau koinēi te wā tika hei toro i tō rātou matua kēkē me tō rātou whaea kēkē, e mōhio ai rātou mō te noho i Ngā Whenua Tōpū o Amerika. I te mōhio rātou ki ngā ture e pā ana ki te hari i te nui o te wē i runga i te rererangi, engari kāore a Matariki (te mea o rātou kātahi tonu ka puta i te taumata tuawhitu i te kura) i mōhio kāore e whakaaehia tana kawē i āna whakapaipai kanohi i roto i tana pēke whakapaipai hou, ki runga i te rererangi. Ka 13 hāora rātou e rere atu ana, ka puta te umere i te taunga anō o te rererangi ki te whenua. Whakamīharo ana rātou i te nui o Te Taunga Rererangi i Los Angeles, kātahi rātou ka whakatata atu ki ngā paepae manene. Me mātua haere te katoa o ngā tāngata i heke mai i taua rererangi ki ngā paepae manene, kia āta tirohia ai ā rātou uruwhenua me te whakaahua anō hoki i tētahi o ō rātou karu.



Ina haere koe ki ngā whenua pērā i Ngā Whenua Tōpū o Amerika, i Ahitereiria, i Kānata, i Ingarangi, i ngā whenua maha o Ūropi, i te taenga ki te paepae manene ka āta tirohia te tūturutanga o tō uruwhenua, arā, ka matawaitia te whārangi tuatahi kia kitea ai te ōrite o te whakaahua ki tō kanohi ake, ka mutu ka “whakaahuatia” anō tō karu. I ētahi whenua, tērā anō ka tangohia he tapukara o tō mati. Ina oti katoa ēnei mahi me te tohu tā i tō uruwhenua, kua wātea koe ki te haere ki te tiki i ō pāhi i te takawhawhe tueke, kua wātea koe ki te tāpoi whenua kē, me te tau o tō ngākau i te mea e mōhio ana ngā āpiha o te paepae manene ko koe tonu koe. Engari e pono ana tēnei kōrero? Ka mutu, e mōhio tūturu ana tētahi atu ko wai koe?

I te taenga atu ki te kāinga o tō rātou matua kēkē, ka noho rātou ki te kai. Ka pātai a Matua Kēkē mō te āhua o ā rāua mokopuna i Aotearoa, mō Nanny Eva me te marae i Te Hauke. I nui ngā kōrero kata me ngā roimata i te kōrerotanga mō te whānau i te kāinga. Ka kōrero mō ngā tāngata kua mate, me ngā tāngata kua whānau mai. Ka pātai a Matariki rāua ko Jamie mō “ngā whetū rongonui”, mō te taraiwa i te taha rerekē o te huarahi me ētahi atu mea. E hiamō ana ngā tamariki ki ngā āhuatanga o tēnei whenua e rerekē ana i ō te kāinga, kātahi ka tīmata ki te whakawhitiwhiti kōrero mō te whakaahua i ō rātou karu i te taunga rererangi. Ka pātai a Matariki mō ana karu kirimōwaho whaikano hou, me tana whakaaro mēnā ka puta he rerekētanga ki te whakaahua i ēnei. I whakaaro a Jamie he aha ia i kīia ai kia tango i ana mōhiti pōuri. He uaua ki a Tihema kia kaua e kemo me te pātai anō ka pēhea te hunga kāpō pērā i a Nanny Eva.

Mehemea kua tau tēnei tūāhua ki a koe, i whakaaro anō koe ka pēheatia ngā whakamōhiotanga kua kohia mōu? Pēhea te whakaahua o tō karu, arā, te matawaitanga o tō mata-ā-ruru ki a koe, ā, ko te pātai ia, ka ahatia taua whakaahua rā?



Kia whāia haeretia tēnei whakaaro ...

Kei te mōhio tātou ko te whakaahua i tō uruwhenua me ō tapukara hei tautohu ko wai koe.

- He aha ētahi atu huarahi hei tautohu i a koe?

Mahi Rangahau Iti: Ka taea pea e ngā ākonga te whakahaere rangahau mō tēnei tūāhua e tautohua ai ētahi huarahi, mai i te kāri Eftpos ki te tātaritanga pītau-ira

I roto i ngā tau kua pahure, he maha tonu ngā huarahi i whāia hei tautohu i te tangata, e taea ai ia te whakanoho mai ki tētahi karangatanga. Ko tētahi ko te ine i te tinana e mōhiohia ai te āhua o te tangata kino. Ko tētahi atu ko te whakamahi i ngā rekoata niho kia mōhiohia ai te tangata kua mate, arā, mai i ō rātou kōiwi.

Ko te whakaahua i te karu, arā, ko te matawai i te mata-ā-ruru me te tango tapukara i a koe, he tauira ēnei o te kohi raraunga *inenga koiora*.

Koia tēnei te whakamāoritanga o te *inenga koiora* a The Association for Biometrics (UK): “He āhuatanga ā-tinana, he momo whanonga rānei ka taea te ine kia mōhiohia ai ko wai te tangata, e whakatūturuhia ai rānei ko ia pono tērā e kī rā ia.”

E kī ana The International Biometrics Group ka pai tonu te whakamāoritanga e whai ake nei: “Te whakamahi aunoa i ngā āhuatanga whaiaroaro, i ngā āhuatanga whanonga ki te tautohu, ki te whakatūturu tuakiri.”

Mahi Rangahau Iti: Ko tā tēnei mahi rangahau he whakatauiria ake i ngā take/hiahia, ngā hātepe me ngā otinga o te kohikohi raraunga taha tinana, raraunga whanonga (mā te tango tapukara, te matawai mata-ā-ruru, te tiro tiro kanohi, te āhuahanga ringa/mati, te whakatūturu ā-reo, te whakatūturu *ā-pātuhi*, *ā-waitohu*) tae atu ki ngā hangarau ka whakamahia hei kohikohi i ngā raraunga inenga koiora nei.

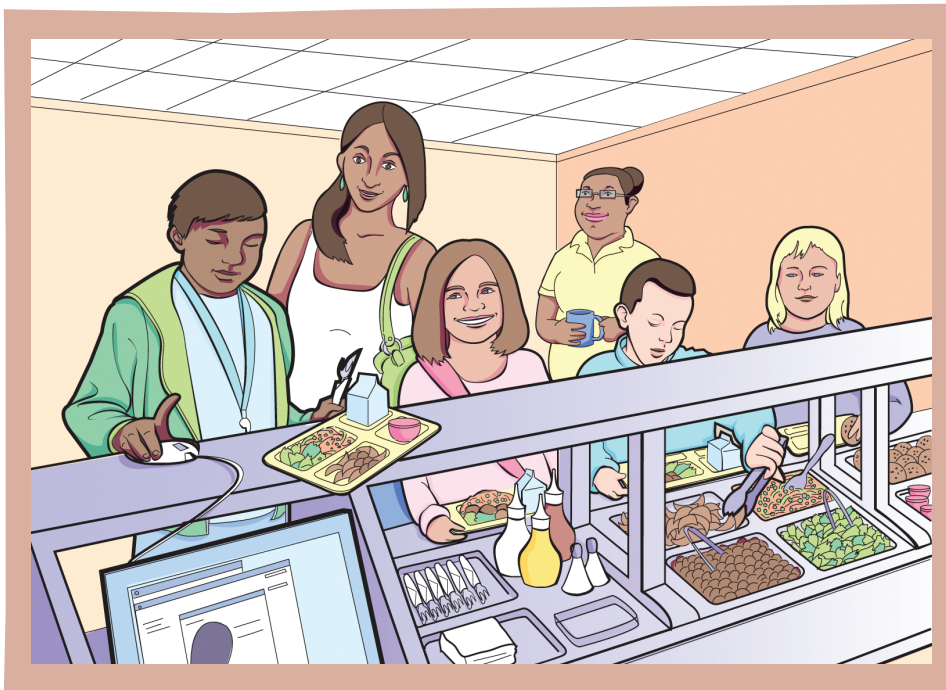
E kōrero ana ngā whakamāoritanga e rua o te inenga koiora mō ngā āhuatanga taha tinana, taha whaiaroaro, me ngā momo whanonga tuakiri, ngā āhuatanga whanonga rānei. He tauira te tapukara me te matawai mata-ā-ruru o te inenga koiora *taha whaiaroaro* nā te mea i takea mai i te raraunga i tīkina atu i te inenga o te tinana tangata. Ko ētahi tauira o te *āhuatanga whanonga*, ko te whakatūturu ā-reo me te whakatūturu ā-waitohu. I takea mai ēnei i tētahi mahi i mahia e te tangata.

Mahi Rangahau Iti: Ka taea te whakamahi raraunga inenga koiora mō te tautohu me te whakatūturu tangata. Mā te whakamahi i ēnei kōrero me āu ake rangahau, whakahiatotia he mahi rangahau e taea ai ētahi raraunga inenga koiora te kohikohi mō ētahi kaupapa. Hei tauira, whakatairitea ngā raraunga inenga koiora ka kohia:

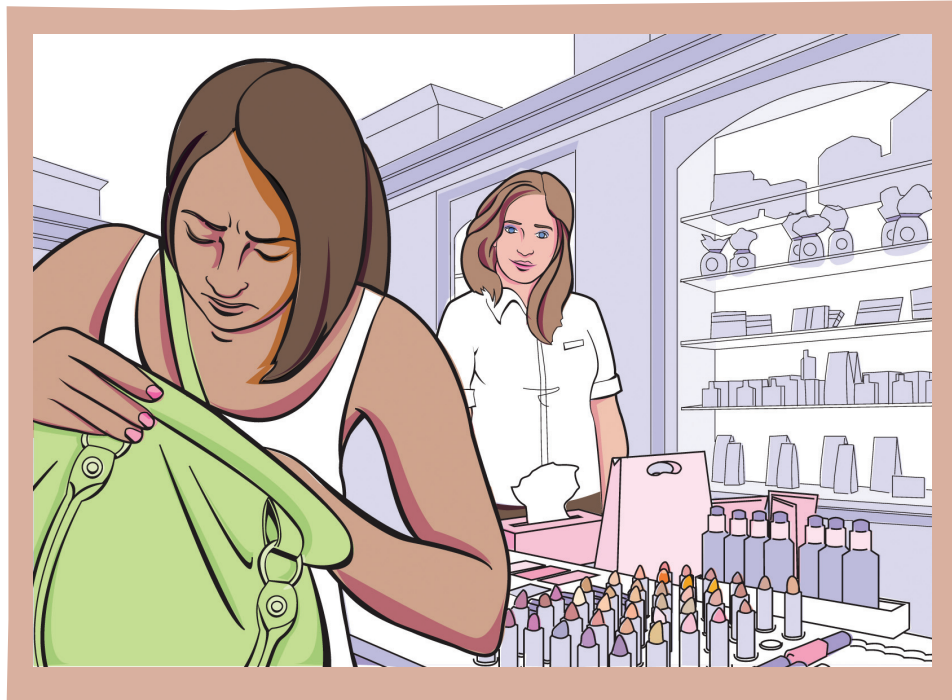
- i tētahi taunga rererangi pērā i Los Angeles Airport;
- i tō hounga atu ki te toro mauhere i tētahi whare herehere;
- ina matawaitia te mata-ā-ruru o ngā tamariki me ngā kaiako o ngā kura o Amerika e whakaaetia ai tā rātou hou atu ki roto.

Ka haere te whānau ki Walt Disney World. E hiamō ana te katoa, taiohi mai, mātua mai. He pai ake te utu ki te haere te whānau mō te toru rā tēnā i te haere mō te rā kotahi, mō te rua rā rānei. I tō rātou taenga atu i te rā tuatahi, ohorere ana rātou i te mea me matawai rawa ō rātou matimati. Ka whakaaro a Tihema he aha rātou i tautohua ai mehemea he tīkiti ā rātou ki Walt Disney World. He aha rātou i kore ai e uru atu i te mana o te tīkiti anake?

Aoināke ka pātai a Matariki mehemea ka pai noa iho tana haere ki te kura kei reira tana whaea kēkē e whakaako ana i ngā tamariki nohinohi. I te tina, ka haere katoa ngā ākonga o te kura nei ki te wharekai ki te tina. He tino rerekē rawa atu tēnei i te kāinga! Ohorere ana ia i tana kitenga i ngā tamariki e matawai ana i ō rātou mati i te putanga atu i te pae utu. Hika mā!



Ko Matariki e hiahia ana ki te hoko whakapaipai kanohi hou i te mea i tangohia āna i te taunga rererangi i Tāmaki Makaurau. Ka haere ia ki tētahi toa huatau. Ka pau te hāora, ka whakaaro ia ka nui ngā whakapaipai kanohi kua kōwhiria e ia hei whakatau i tana āhua, ka haere atu ki te utu. Ka tahuri ia ki te kimi i tana kāri i roto i tana pāhi, kāore i kitea e ia. Ka mau tōna pōuri i te mea e tino hiahia ana ia ki te whakapaipai kanohi. Waimarie i tae ake tana whaea ki te kimi i a ia, ka riro māna e utu ngā whakapaipai a Matariki. I te hokinga ki te kāinga o Matua Kēkē, ka tahuri anō ia ki te kimi i tana kāri, kāore tonu e kitea. Ka māharahara te whānau ki tana kāri me te tūmanako anō, kāore i ngā ringa o tētahi atu. Ka whakaaro a Matariki ki ngā kōrero mōna i runga i tana kāri e tautohua ai ko ia te rangatira o taua kāri. Ka rahi anō aua kōrero mōna, ka mutu he aha atu ngā kōrero kua utaina ki tana kāri kia kore ai e taea e tētahi atu te whakamahi?



Mahi Rangahau Iti: Mai i ngā kōrero o runga ake nei, whakarārangitia ngā āhuatanga matua ka āta whakaarotia i tēnā, i tēnā kaupapa i kohia ai, i hiahiaia ai he raraunga inenga koiora. Whakaraupapatia mai ko te kaupapa matua rawa ki mua, ka heke iho, me te whakamārama mai anō he aha i pēnei ai ō whakaaro.

E mārama ana te kite atu he nui ngā kōrero e kohia ana ina kohia ētahi raraunga inenga koiora. Ka ahatia te katoa o ngā kōrero ka kohia?

Ko te kohinga raraunga he pātengi raraunga.

Mahi Rangahau Iti: Kimihia mai ētahi atu kōrero mō te pātengi raraunga, tae atu ki te whakamāoritanga o te kupu me ētahi tauira. Kimihia mai ētahi atu kōrero mō ngā wā e kimihia ai he māramatanga i te pātengi raraunga.

Ko ētahi māharahara e putu ana i te pātengi raraunga mō te tangata, ko te noho haumaruru o ngā kōrero i te pātengi raraunga me te āhei o te tangata ki te toro atu ki aua kōrero.

Ka taea e ngā ākonga te rangahau te noho haumaruru me ngā take e pā ana ki te toro i ngā kōrero o te pātengi raraunga.

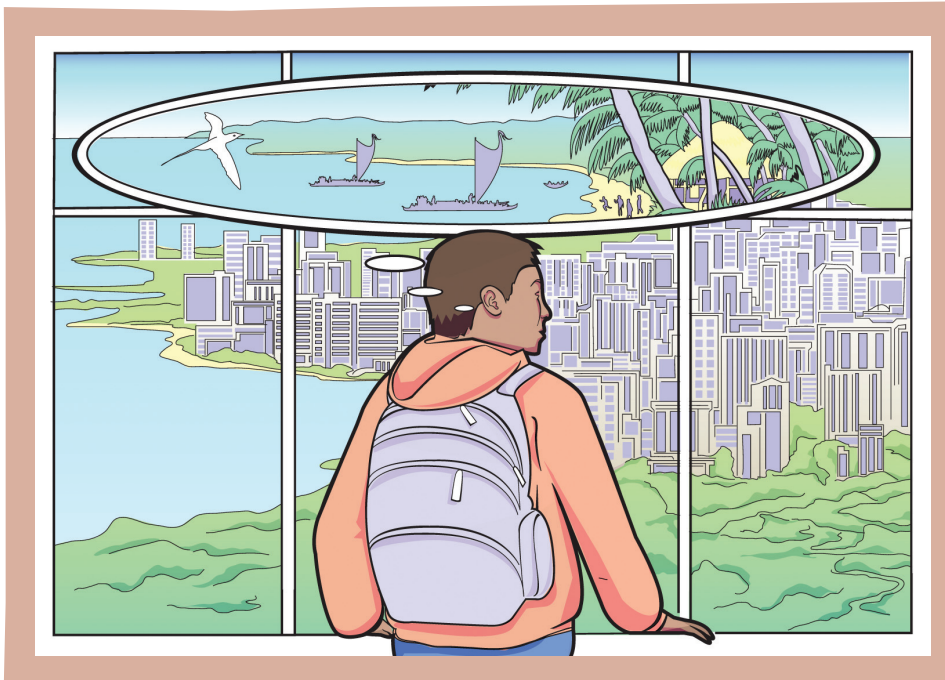
I ētahi pātengi raraunga kei te tokoiti anake te mana toro atu, i ētahi atu pātengi raraunga, kei te tokomaha te mana toro atu.

- Ka pēhea ō whakaaro mehemea e pupuritia ana e ētahi atu he kōrero mōu?
- Mēnā e pupuritia ana e ētahi atu he kōrero mōu, ka pēhea tā rātou whakamahi i aua kōrero?
- Ko wai katoa te hunga e whakaaetia ana tā rātou kōhi raraunga inenga koiora mōu?
- He mea nui anō kia whai wāhi koe ki ngā kōrero i te pātengi raraunga mōu?
- Kia pēhea rawa te nui o ngā kōrero mōu?

Kei te kaupapa tonu o te pātengi raraunga tōna nui, tōna iti rānei. He kaupapa tō ngā pātengi raraunga katoa.

Mahi Rangahau Iti: E tika ana anō kia whakaaro koe he kaupapa whai tikanga tō ngā pātengi raraunga katoa? Whakahaeretia tētahi mahi rangahau e hōparatia ai ētahi pātengi raraunga, te kaupapa i whakatūria ai, te āhua o te whakamahi, ko wai katoa e whai mana ana ki te toro i ōna kōrero. Whakaarotia ake te pātengi raraunga mō te whakapapa. E hāngai ana anō tēnei ki ngā paearu o ētahi atu pātengi raraunga?

I a rātou e hoki ana ki Aotearoa i muri i tā rātou hararei whakamīharo i te taha o tō rātou whaea me tō rātou matua kēkē, ka peka atu te whānau Makoare ki Hawai'i ki te toro i ētahi hoa. E kuraina ana ngā tamariki a ō rātou hoa i Te Kura o Kāmeheameha – he kura mō ngā tāngata whenua o Hawai'i. E tika ana hoki kia toro rātou i te kura. Mīharo ana rātou i te rerekētanga o te kura i ngā kura o te kāinga, tae atu hoki ki te tirohanga pārekareka ki Waikiki. Ka tīmata te whakaaro o Jamie ki tana whakapapa i te mutunga o tana toro i Te Kura o Kāmeheameha, i te mea i kōrerohia ki a rātou te hītori mō te whakatūnga o te kura, waihoki, te hītori o ngā tangata whenua o Hawai'i i Ngā Whenua Tōpū o Amerika.



Mehemea e tāpoi tahi ana tō whānau katoa, he nui ngā kōrero ka wetewetea tahitia mō tō whānau.

- Ka puritia anō ngā kōrero nei i raro i tō ingoa whānau?
 - Ka pēhea ngā kōrero ka kohia mō ngā Māori katoa kua tae ki ērā whenua?
 - He aha ētahi take ki tō whakaaro e whakamahia ai aua kōrero?
- E whakaaro ana pea ētahi ko te Human Genome Project te tino o ngā pātengi raraunga katoa.



He tauira te whakapapa o te pātengi raraunga.

Ko tētahi whakamāoritanga o te whakapapa ko: "... te hekenga mai ā-papa o ngā mea ora katoa mai i ngā atua ki nāiane. Ko te whakapapa te pūtake mō ngā whakaritenga mātauranga e pā ana ki te orokohanga me te whakahiatotanga o ngā mea katoa. Mā te whakapapa e mana ai te taura tangata, te taura ohaoha, ā, ko te mana o te rangatira he hanga tuku iho. He taonga whakahirahira tēnei mea te whakapapa, me te aha, puta ana te kohakoha kia mau tonu ai. Ko tētahi whakamārama o te whakapapa ko te whakatakoto ā-papa i ngā reanga, tētahi ki runga i tētahi, ā, mā te tātai e kitea ai tēnei."

Mahi Rangahau Iti: Hōparatia te whanaungatanga i waenganui i te rangahau me te whakatakoto whakapapa me te hanga pātengi raraunga mō tētahi atu mea, pērā i te pātengi raraunga mō te katoa o ngā tāngata ka tae ki tētahi hui nui, ngā tāngata katoa rānei e pēke ana i te Kiwi Bank.

Ina rangahauhia he kōrero mō te whakapapa, ko ngā raraunga pērā i te ingoa, te rā whānau, te wāhi i whānau ai, mehemea he tāne he wahine rānei, te rā me te wāhi i mate ai, te wāhi i tanumia ai, ka kohia ēnei kōrero kia taea ai te hono i ngā whanaunga e rite ana o rātou whakapapa, tētahi ki tētahi. Kua kohia kētia te nuinga atu o ēnei momo kōrero mō tātou, hei tauira, ina tonu tātou mō tētahi uruwhenua. He aha te mea ka taea e te tangata ina ngaro tana tiwhikete whānau mai? Me pēhea te whakaū anō i te tuakiri o te tangata?

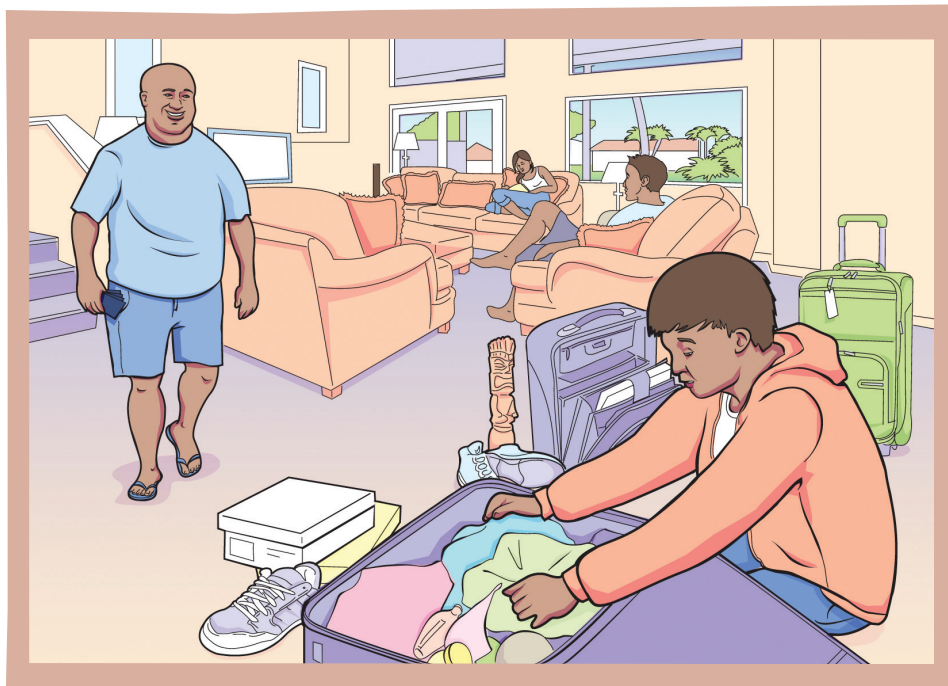
I tū tētahi Hui Tuakiri i Te Papa Tongarewa i te marama o Paenga-whāwhā, i te tau 2008. Ka kōrerotia i reira tā te Māori titiro ki te tuakiri, ki te whakapapa i ngā pai me ngā kino o te Ipurangi. He aha ngā maru kei reira ina noho mai te whakapapa ki te Ipurangi?

Mahi Rangahau Iti: Whakamahia ngā kōrero o runga ake nei ki te hōpara i ngā pāpātanga o te kōrero mō te Māori, tae atu ki te whakapapa, i te Ipurangi.

- He aha ngā hiahia me ngā painga ki te Māori i tēnei tūāhua?
- Me aha tātou ina whakaarohia Te Tiriti o Waitangi me ngā hiahia o te taiohi Māori i te rautau rua tekau mā tahi?
- He rerekē anō ēnei ki ngā hiahia o ngā kuia me ngā kaumātua o ēnei rā?
- E tiaki ana ngā ture o te whenua i ā tātou motika e tohua ana e Te Tiriti o Waitangi?
- Whakaarohia ake te Privacy Act e arotahi ana ki te tangata kotahi, engari ko tā te Māori he arotahi ki te katoa.
- Me pēhea e noho haumaruru ai te kohinga mātauranga mō ngā Māori katoa e kīia nei ko te whakapapa, i te taiao Ipurangi e noho nei tātou?

Ka tahuri ngā whakaaro o Jamie ki te hokinga ki te kāinga, ki Te Hauke, mai i Hawai'i. Ahakoa tana pōuri ki te whakarere atu i Ngā Whenua Tōpū o Amerika e rikarika ana ia ki te kite anō i āna hoa, ki te kōrero mō tā rātou haere. He mahi nui ki te pōkai anō i ō rātou kākahu kia uru atu ki ngā tueke i te nui o ngā mea i hokona e rātou. Kī ana ngā pāhi i te hū. Huri rawa ake, kua kore e kitea e Jamie tana uruwhenua. E hika! Kei runga, kei raro e kimi ana. Kua tata te mauri rere, kātahi ka mahara ake he mea hoatu e te katoa ā rātou uruwhenua ki a Pāpā i te taenga atu ki Hawai'i.

Kāore rātou i tino pīrangi te hoatu ki a ia i te mea he pai te mau haere i tāu ake uruwhenua, heoi kāore tēnei i whakaaehia. Ko te tūmanako kei a Pāpā tonu. Ki te kore, e kore rātou e tukuna kia wehe atu i Ngā Whenua Tōpū o Amerika. Ka pai tonu tērā ki a Tihema rātou ko Matariki, ko Jamie!



Ka taea anō e koe te hoki ki te paepae manene i te taunga rererangi i Hawai'i, i te ngaronga o tō uruwhenua, kia whakatūturutia tō tuakiri mā te matawai anō i tō mata-ā-ruru, ka whakatairite i tērā ki te matawaitanga o tō mata-ā-ruru i matawaia i mua?

He Kupu Taka

āhuatanga ā-tinana/ āhuatanga taha tinana	<i>physical characteristic/trait</i>	paepae manene	<i>immigration counter</i>
āhuatanga ringa/mati	<i>hand/finger geometry</i>	pātengi raraunga	<i>database</i>
āhuatanga whanonga	<i>behaviour characteristic/trait</i>	pītau ira	<i>DNA</i>
āpiha o te paepae manene	<i>immigration officer</i>	raraunga	<i>data</i>
aunoa	<i>automated</i>	raraunga inenga koiora	<i>biometric database</i>
inenga koiora	<i>biometric (biological measurement)</i>	raraunga taha tinana	<i>physical data</i>
inenga koiora taha whaiaroaro	<i>physiological biometrics</i>	raraunga whanonga	<i>behavioural data</i>
inenga koiora taha whanonga	<i>behavioural biometrics</i>	takawhawhe tueke	<i>luggage carousel</i>
karu kirimōwaho whaikano hou	<i>coloured contact lenses</i>	tapukara	<i>fingerprint</i>
koiora	<i>biology/biological</i>	tirotiro kanohi	<i>facial recognition</i>
mata ā-ruru	<i>iris (of the eye)</i>	tuakiri	<i>identity</i>
matawai	<i>scan</i>	tūturutanga	<i>authenticity</i>
Ngā Whenua Tōpū o Amerika	<i>The United States of America</i>	uruwhenua	<i>passport</i>
paearu	<i>criteria/standard</i>	whaiaroaro	<i>physiological</i>
		whakatūturu ā-pātuhi	<i>keystroke recognition</i>
		whakatūturu ā-reo	<i>voice recognition</i>
		whakatūturu ā-waitohu	<i>dynamic signature recognition</i>
		whanonga	<i>behaviour</i>



Te Marautanga o Aotearoa

I ahu mai ēnei kōrero i Te Marautanga o Aotearoa

Ko te iho o te hangarau kei te waiata e whai ake nei. Mai i te whakaharatau hangarau a ō tātou tūpuna tae noa ki ngā tukanga hangarau o te ao hurihuri, i whakatakotohia e ō tātou tūpuna he huarahi hei whāinga mā tātou.

Tikina atu i tuawhakarere
I te ao kōhatu
Ngā mōhiotanga o rātou mā
Hei kawē i a tātou i roto i te ao tūroa
Kua takoto kē te whāriki i rarangahia e rātou
Wānangahia, tuakina kia tau
Rangahaua kia maumahara
Manakohia kia whiwhi ai
Te mātauranga Māori motuhake

Kia tipu ake te kākano hangarau ki ā tātou ākonga, me whakawhiti kōrero, me raweke, me whakamātau kia mau tonu.

Te whaitake o te ako i te hangarau

Me whaitake ngā kaupapa hangarau kia kore ai e whāia mō te kore noa iho.

Mā te hangarau ka tū rangatira ngā ākonga. Hei whakahiato i ngā mōhiotanga hangarau, ka tīmata i te ao Māori me tōna hāngai ki te ao hurihuri. Me aro anō ki ngā uara, ngā pūkenga, me ngā mōhiotanga hangarau o te ao e taunga ana ia.

Te hanga o tēnei wāhanga ako

E rua ngā whenu, ko Ngā Āhuetanga o te Hangarau me Te Whakaharatau Hangarau. Kātahi ka taka mai ki ngā aho hangarau e rima. Ko te Hangarau Koiora, Te Tuku Mōhiotanga, ko Ngā Hanga me ngā Pūhanga Manawa, ko Te Tāhiko me te Hangarau Whakatika, me te Hangarau Kai.

E tika ana kia tūhuratia ngā āhuetanga o ngā momo matū kei ia kaupapa hangarau. Ā, he wāhi anō mō te āta whakaaro ki te taha hātepe me te taha whakanao. Kei roto aua wāhanga i te mahere hoahoa a te ākonga.

He rerekē ngā mōhiotanga kei ia whenu. Me hono ngā whenu e rua ki ngā aho kua kōwhiritia hei tūāpapa mō te mahi hangarau. Mai i te kaupapa whānui ka taka iho ngā aho hei āwhina. Tērā pea e rua, e toru rānei ngā aho e hāngai ana. Me hāngai te aromatawai ki ngā whāinga kei ngā whenu.



Ngā āhuatanga o te hangarau

Ka whakaahuatia te whakaharatau hangarau e:

- ngā tāngata me ō rātou āhuatanga katoa;
- ngā hiahia me ngā huarahi wātea o te ao whānui.

Ka rangahau, ka tūhura ngā ākonga kia mārama ai rātou ki ngā uara me ngā whakapono o te tangata, kia mārama anō ki te pāpātanga o aua āhuatanga ki te whakahiato hangarau.

Ka mōhio ki te tiaki whenua, ki te tiaki taiao, me te pāhekotanga i waenganui i te whakaharatau hangarau me te haporī. Ko te ira atua, ko te ira tangata e noho ngātahi nei te tangata me te whenua.

Me whakaaro ki ngā mahi toitū a ngā tūpuna tae noa mai ki tēnei wā. Me āta titiro ki te pānga o te otinga hangarau ki a Papatūānuku rāua ko Ranginui.

Toitū te whenua, whatungarongaro te tangata. Toitū te whenua, toiora te tangata.

Te whakaharatau hangarau

I roto i tēnei whenu ka pakari haere ngā mōhiotanga me ngā pūkenga hangarau. Ko te whakaharatau hangarau te tōpūtanga o ngā mōhiotanga me ngā pūkenga e puta ai he otinga.

Ētahi pūkenga hangarau:

- te whakaraupapa i ngā mahi hei hātepe;
- te tautohu i ngā hiahia me ngā huarahi wātea hei painga mō te tangata;
- te arotake i ngā hātepe me te otinga i runga i te aro nui ki te take;
- te tīpako me te whakamahi i ngā mātāpono hangarau;
- ngā pūkenga ā-ringa, ngā pūkenga auaha e puta ai he otinga.



Ētahi mōhiotanga hangarau:

- ngā mahi hangarau a ngā tūpuna tae noa ki ēnei wā;
- te āheinga ki te whakatutuki i tētahi hiahia i runga i te tika;
- kia mārama ngā ākonga ki ngā hapori, ki ngā ahurea me ngā tāngata taketake;
- kia mārama ngā ākonga ki ngā mātāpono hangarau me te tika o te whakamahi.

Ngā Aho	Hei whakamārama
Hangarau Koiora	Ko tā te hangarau koiora, he whakamahi i ngā pūnaha whai oranga hei raweke i ngā tukanga māori, hei painga mō te tangata. Tērā pea ko te whakatipu ā-wai, ko te rongoā, ko te tiaki rauropi rānei e tata korehāhā ana. Ka whai wāhi hoki ki te tūhura i ngā tini āhuatanga o te raweke ira.
Te Tuku Mōhihio	Ko te tuku mōhihio, he whakawhiti mōhiotanga, arā ko te reo, me ngā toi ataata pērā i te whakairo, tae atu ki te tuhi, mā te pene, mā te rorohiko, mā te aha atu rānei. He tirohanga whakamua, whakamuri hoki.
Ngā Hanga me ngā Pūhanga Manawa	Ka tīmata te hanga ki ngā hanga māmā noa, pērā i te pouaka kawē, ka piki ake ki ngā hanga uaua, pērā i te pā tuna, i te tāwhiti kiore, i te manu aute. Ka mārama ki te hononga me te pānga i waenganui i ngā wāhanga o te hua, me te tino take o ia wāhanga.
Te Tāhiko me te Hangarau Whakatina	Ko te tāhiko te hoahoa, te hanga, me te whakanao i ngā pūnaha hiko me ngā pūrere tāhiko. Ko te hangarau whakatina te whakahaeretanga o ēnei pūnaha pūrere tāhiko.
Hangarau Kai	Ko te hangarau kai ko ngā āhuatanga katoa o te whakatipu, te hauhake, te tohu, te tunu, te rokiroki me te tākai kai. Ka tūhuratia hoki ngā āhuatanga kawekawe o ngā tūmomo kai hei whakahiato i ētahi atu kai.

Taumata 6

Ngā Āhuatanga o te Hangarau

1. Ka tirohia ngā uara me ngā whakapono o iwi kē, ka:
 - whakahāngai ki te otinga;
 - mōhio ki ngā whakaharatau;
 - whakarite ki ngā hangarau a tangata kē;
 - mārama ki ngā ārai me ngā huarahi wātea ka taea.
2. Ka tūhura i ngā āhuatanga matua o te tangata e pā ana ki:
 - ngā pūnaha, ngā tukanga rānei;
 - te hiahia o ngā kiritaki;
 - ngā rautaki whakatairanga ki te kiritaki.

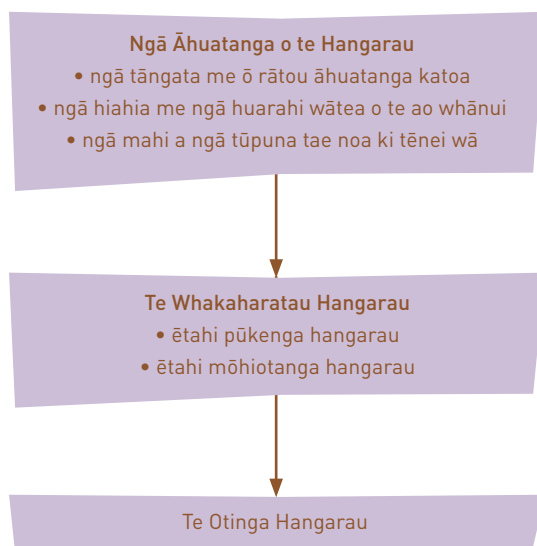
Te Whakaharatau Hangarau

3. Ka arohaehae i ngā whakatakotoranga hoahoa whaiaro, ā ētahi atu hoki, hei āwhina.
4. Ka whakamātautau i ngā raraunga me ngā mōhiotanga hou kia puta ai he otinga tika.

Te Whakawhanaketanga o te Otinga Hangarau

E whakarāpopoto ana te hoahoa i raro nei i te ara e puta ake ai he otinga hangarau. Heoi, ehara i te mea ka āta whāia tēnei raupapa i ngā wā katoa; ka āhua haere kōtuitē te mārama haere ki ngā āhuatanga matua o te hangarau me te whakaharatau hangarau, e puta ai te otinga hangarau ā tōna wā.

Te whakawhanaketanga o te otinga hangarau



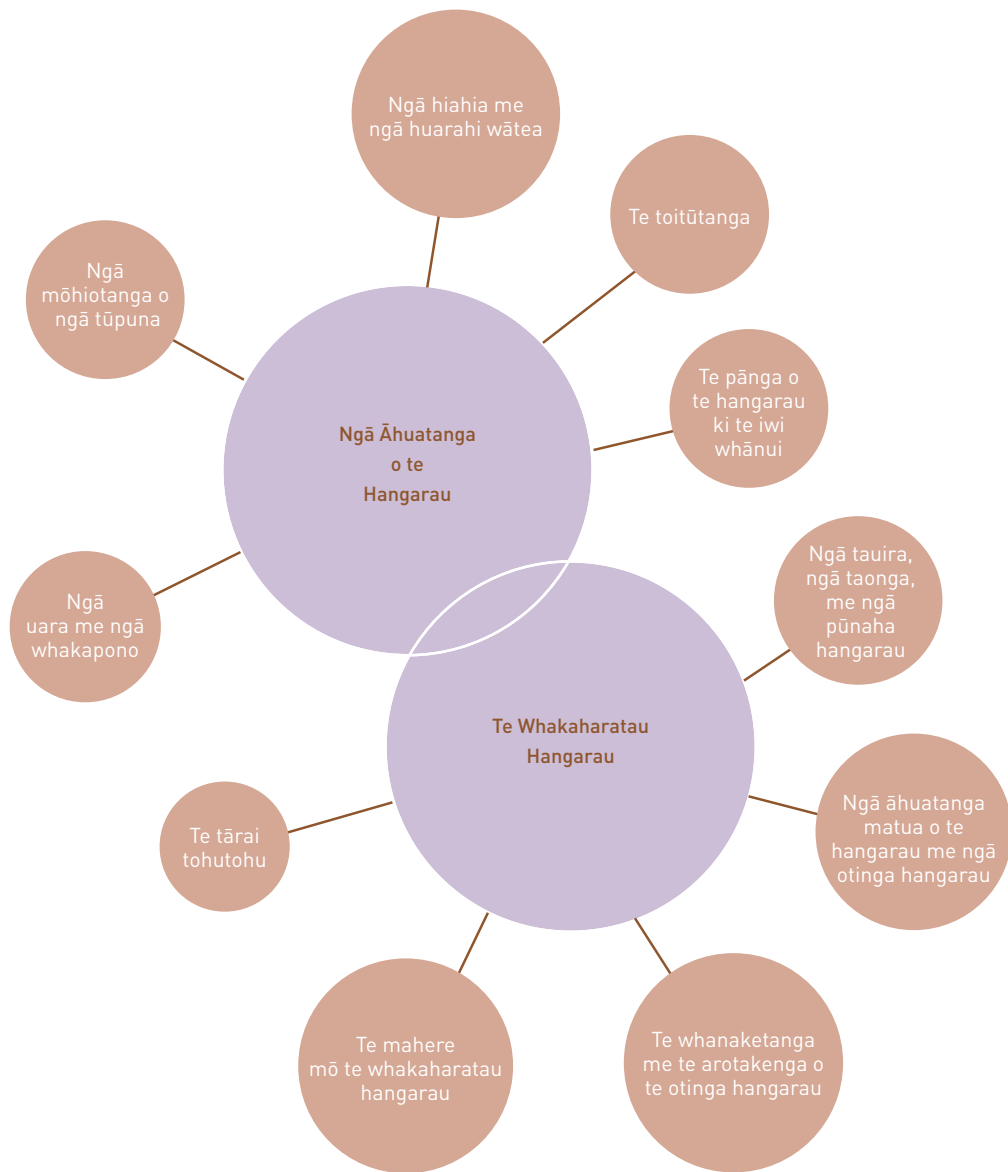
Kei te whakaatu tēnei tauira o te whakawhanaketanga otinga i te tukanga hangarau e puta ai he otinga hangarau. E whakaataria ana anō hoki tēnei i te anga e whai ake nei.





Te Anga Whakaū Māramatanga ki te Tukanga Hangarau

Ngā āhuatanga māramatanga ki te tukanga hangarau



He Kupu Taka

āhuatanga hangarau	technological characteristic/feature	ngā tauira, ngā taonga, me ngā pūnaha hangarau	technological models, products, and systems
āhuatanga māramatanga ki te tukanga hangarau	characteristics/features for understanding the technological process	otinga hangarau	technological outcome
āhuatanga matua	key characteristic/feature	pānga ki te iwi	impact on society
arotakenga	evaluation	tārai tohutohu	brief development
hiahia me ngā huarahi wātea	needs and opportunities	toitūtanga	sustainability
māhere	plan	uara	values
mōhiotanga o ngā tūpuna	knowledge tūpuna have	whakaharatau hangarau	technological practice
		whakapono	belief
		whanaketanga	development

Te Whakaharatau Hangarau

Te tārai tohutohu

Ka whakatakotoria he tohutohu hei āta whakaahua ā-kupu i te otinga e wawatatia ana kia puta hei whakatutuki i tētahi hiahia, i tētahi huarahi kua wātea, i tētahi take rānei. Mā ngā tohutohu e āta whakaatu ngā mahi kia mahia, ā, he aha te take me mahi aua mahi. Ka tuhia ngā tohutohu hei whakapuakitanga huatau.

I roto i ngā tohutohu, me mātua tautohu:

- te otinga e tūmanakotia ana kia puta;
- te hiahia, te huarahi rānei e wātea ana;
- he whakapuakitanga huatau;
- ngā whakatakotoranga whāiti;
- te taiao tūturu me te taiao pāpori;
- te arotakenga a ngā hunga whai pānga mai.

Āta whakaarohia tāu i pānui ai i tēnei pukapuka me tāu i kite ai i te kōpae ataata mō te inenga koiora. Mā te whakautu i ētahi o ngā pātai e rārangi iho nei, ka āwhinatia koe ki te whai whakaaro ki ngā tohutohu tērā pea i whakatakotoria mō ēnei tūmomo hangarau. E hāngai ana ngā pātai ki ngā hangarau katoa e tirohia ana i te kōpaki nei, me ētahi atu hangarau hou tērā kua ara ake i nā tata nei.

- Ki tō mōhio, he aha te otinga e tūmanakotia ana kia puta i tēnei hangarau?

Whiriwhiria ko wai mā ngā hunga whai pānga mai. Ko ngā hunga whai pānga mai ngā tāngata me ngā rōpū ka puta he otinga – ahakoa pai, ahakoa kino – ki a rātou i te hangarau.

- He aha te otinga e tūmanakotia ana e ngā tāngata takitahi pēnā i a koe nā?
- He aha ōu nā hiahia?
- He āhuetanga haumarua anō e tika ana kia tirohia?
- Me pēhea koe e mōhio ai kāore he pānga kino o te hangarau ki a koe, ki tō tinana?
- Ki ō whakaaro, he mea nui kia āta tautohua ō hiahia, tae atu ki ō ērā atu tāngata whai pānga mai?
- Me pēhea e mōhio ai ngā kaitārai tohutohu ki ēnei hiahia?

He aha ētahi o ngā huarahi wātea e rere tahi ana me tēnei hangarau?

- Whakaarohia ngā wāhi maha, ngā horopaki maha tērā e whakamahia ai te hangarau nei.
- Me pēhea e taea ai e ngā kaitārai tohutohu te whaiwhai haere te maha tonu o ngā huarahi e wātea ana? (Hei tauira, me whai whakaaro ki te momo konganuku e hangaia ai te taonga.)
- Āe rānei kua puta he rerekētanga i roto i te hangarau i te kitenga o ētahi āhuetanga hou o roto i ētahi konganuku i nā tata nei? (Hei tauira, whakaarohia ngā hangarau matū o te hanga waka tuarangi.)

Ka pēhea te āhua o te whakapuakitanga huatau?

- Whakaarohia ngā mahi kia mahia e te taonga hangarau e whakaarohia ana, ā, he aha i pērā ai.

He aha ētahi o ngā whakatakotoranga whāiti?

- Ka taea ēnei te rāwekeweke kia hāngai ake ai ki te otinga e tūmanakotia ana kia puta?
- E hāngai ana ngā whakatakotoranga ki ngā hiahia me ngā huarahi wātea kua tautohua?



Ko te taiao pāpori, ko ngā āhuatanga matatika, ngā āhuatanga tōrangapū, ngā āhuatanga ahurea, me ngā āhuatanga ohaoha: ki ō whakaaro, i arohia e ngā kaitārai tohutohu ki ēnei āhuatanga katoa?

- Whiriwhiria te pānga o te hangarau nei ki ngā tikanga Māori.
- Āe rānei me pare ngā tikanga o ia rā ki te taha hei kauawhi i tēnei hangarau?
- He aha ngā tikanga o ia rā e mōhiotia ai ko wai te tangata i roto i āna mahi tahi, i āna hono tahi ki ētahi atu? (Nō hea koe? Ko wai ō mātua?).

Ka taea te pēnei, e tika ana rānei kia pēnei te mahi, i ētahi atu horopaki – pērā i ngā wāhi ko ētahi tāngata anake ka whakaaetia kia kuhu atu?

- Whakaarohia ngā āhuatanga e hapa ana i ā tātou tikanga Māori o ia rā, ina whakatairitea ki ngā tikanga e whāia ana i ētahi atu horopaki.
- Ka tirohia anō tēnei ina tāraia ngā tohutohu? Whakamāramatia tō whakautu.

He mea nui te arotakenga a te hunga whai pānga mai. Toroa ngā huarahi e rongo ai ngā kaitārai tohutohu i ngā whakaaro o ngā rōpū whai pānga mai mō tēnei tūmomo hangarau.

- Kua whai wāhi anō koe, tētahi atu tangata rānei e mōhio ana koe, ki tētahi arotakenga pēnei?

He Kupu Taka

arotakenga	<i>evaluation</i>	tautohu	<i>identify</i>
hunga whai pānga mai	<i>stakeholders</i>	te hiahia, te huarahi rānei e wātea ana	<i>need or opportunity</i>
otinga e tūmanakotia ana kia puta	<i>desired outcome</i>	tohutohu	<i>brief</i>
taiao pāpori	<i>social environment</i>	whakapuakitanga huatau	<i>conceptual statement</i>
taiao tūturu	<i>physical environment</i>	whakatakotoranga whāiti	<i>specification</i>

Te mahere mō te whakaharatau hangarau

Ina whakapaua he kaha kia whaihua tonu te mahere, ka pai noa ake te whakaharatau hangarau.

Ko te mahere, ko te āta whakariterite i a koe mō te wāhi ki ngā mahi kei mua i a koe. Ko te whakamahere i runga i te whaihua, ko te āta whakatina i ngā rauemi (pērā i ngā rawa, i te wā, me ngā tāngata) kia tino puta ai ngā painga.

Hei wāhanga o te mahere, ka whakahuatia ētahi putanga kia ea i te ekenga o ia wāhanga matua o te kaupapa, āhea, ā, ka pēhea te whakamahi i ngā rauemi e ea ai aua putanga.

Arā ētahi momo āwhina ka kīia he “taputapu” mahere, koia ētahi ko: te ohia manomano, te mahere hinengaro, te tahua whakaaro, te hautaka huritao, te pukapuka kohinga kuha, te mahere whakatutuki, te tūtohi Gantt, te hoahoa ripo, te kaitātai ataata, tae atu ki ētahi tikanga whakakaupapa, tikanga hoahoa.

Heoi anō, ko te taputapu e kōwhiria ko tērā e rite ana, e hāngai pū ana ki te mahi.

Mā te whakamahi taputapu mahere, ka taea te anga whakamuri ki ngā mahi kua mahia kētia, ka whakahāngai ai ki tāu e mahi ana i nāianei, me ngā rā kei mua i te aroaro. Ko te tātari hoki tētahi wāhanga nui o ngā mahi whakariterite. Kia rite tonu te āta tirotiro i ō mahi, kia mōhio ai koe āe, e whaihua ana, pēhea kē rānei.

He mea nui anō kia tāwariwari te mahere, engari kia pakari tonu te hanga.

Ko te mahere tāwariwari, ko te mahere e taea ana te kuhu atu ētahi whakarerekētanga ki roto, nā runga anō i ngā mahi arotake i te pai, i te whaihua o ngā mahi e kawea ana.

Ko te mahere pakari, ko te mahere ka tū tonu, ka haere tonu ina kuhuna atu ēnei whakarerekētanga.

Āta whakaarohia tētahi kaupapa e kohia ai he raraunga inenga koiora mai i ngā ākonga katoa o tō kura, i tētahi atu hunga rānei. Kia whai tikanga tonu te kaupapa, ā, kia matatika anō. Whakaotia mai te rerenga kōrero e whai ake nei (tētahi rānei e āhua pēnei ana te takoto), hei ārahi i a koe ki te kimi i tētahi take tūturu hei kōhi i ngā raraunga:

Kei te hiahia mātou ki tēnei momo tautohunga, whakatūturutanga rānei, i te mea i tō mātou kura /i taua wāhi (tuhia tētahi mahi/ āhuatanga e kawea ana i konei) ā, e tika ana kia aromatawaia tēnei.

He aha ngā mahi mahere me mātua tutuki e kohia ai ēnei raraunga inenga koiora?

Me tuhi tētahi mahere, me te kuhu atu i ngā rā me mātua oti tēnā me tēnā mahi. Me tīmata te kohikohi i ngā raraunga āhea?

Me kōwhiri he taputapu mahere e tae pai atu ai koe ki te wā e tīmata ai tō kohikohi i ngā raraunga.

- He aha te taputapu mahere pai e horahia ai ngā kōrero ka hiahia? (Ka pai pea te mahere hinengaro, te ohia manomano rānei hei taputapu tua-tahi.)
- Mā tētahi taputapu tātari koe e āwhina ki te titiro whakamuri ki ngā mahi kua mahia kētia. Kei te mōhio koe ki tētahi taputapu tātari, ka taea rānei tētahi te rapu haere?
- He aha te taputapu pai e ū ai ngā mahi kia mahia ki ngā rā e tika ana kia oti aua mahi?

Ahako he aha te taputapu ka tīpakohia, me hāngai pū ki te mahi. Whakaotia te tūtohi e whai ake nei hei whakaatu i ngā taputapu mahere tērā ka whakamahia, me te hāngai o tēnā, o tēnā ki te mahi e tohua ana māna. Hei āwhina i a koe i te whakakī i tēnei pouaka, pātaihia te pātai e whai ake nei:

- He aha te take koinei te taputapu mahere pai katoa hei whakatutuki i tēnei āhuatanga?

Āhuatanga	Taputapu mahere	Te hāngai pū ki te mahi kua tohua māna
Te whakariterite i te wā		
Te kohikohi whakaaro		
Te tātari i ngā mahi kua mahia kētia		
Te whakahāngai i ngā mahi kia mahia ki ngā rā me mātua oti aua mahi		

Hei āwhina i a koe ki te whakakī i tēnei, pātaihia te pātai e whai ake nei: He aha i noho ai koinei te taputapu tino pai rawa atu mō tēnei kaupapa?

He Kupu Taka

e hāngai pū ana ki te mahi	<i>fitness for purpose</i>	ohia manomano	<i>brainstorming</i>
hautaka huritao	<i>reflective journals</i>	pukapuka kohinga kuha	<i>scrapbook</i>
hoahoa ripo	<i>flow diagram</i>	tahua whakaaro	<i>idea banks</i>
kaitātai ataata	<i>graphical organisers</i>	taputapu mahere	<i>planning tool</i>
mahere hinengaro	<i>mind map</i>	tikanga hoahoa	<i>diagramming techniques</i>
mahere pakari	<i>robust plan</i>	tikanga whakakaupapa	<i>structuring techniques</i>
mahere tāwariwari	<i>flexible plan</i>	tūtohi Gantt	<i>Gantt charts</i>
mahere whakatutuki	<i>plan of action</i>		

Te whanaketanga me te arotakenga o te otinga hangarau

Ko te whakamaunga atu mō te whakaharatau hangarau, kia puta tētahi otinga hangarau e hāngai pū ana ki te mahi i whakaritea māna i te tīmatanga, arā, i roto i ngā tohutohu. Tērā pea he momo taonga tonu te otinga e taea ana te whāwhā, tērā rānei he pūnaha.

Hei whakawhanake i tētahi otinga, me hihiri ake ngā whakaaro auaha, kātahi ka whakapaipai haerehia ēnei i runga i ngā kitenga rangahau, i ngā whakamātautau, i ngā mahi tātari, i ngā mahi whakamātau papanga, tae atu ki te arotakenga i runga i ngā kōrero whāiti i tuhia ki ngā tohutohu.

Me kī ko te whakawhanake otinga me te whakaharatau ngā takahanga whakamātau, waihanga o te whakaharatau hangarau.

Tērā tonu ka puta ētahi otinga waenga i te whakawhanake haeretanga o te otinga whakamutunga. Ko tā aua otinga waenga, he tautoko i te neke whakamua o ngā mahi whakawhanake, he whakaatu rānei he pai ake kia hikina ngā mahi, kia mahia ai ētahi whakarerekētanga, me whakamutu katoa atu rānei.

He tauira ēnei e whai ake nei o ētahi otinga waenga o ngā mahi whakaharatau hangarau:

- He rangahau mēnā ka taea te mea e wawatatia ana.
- He tohutohu kua oti te tārai?
- He whakaahua hukihuki o te huatau.
- He whakaaritanga ā-rorohiko.
- He tauira pakupaku.
- He tauira taketake.

Ka pai ake ngā mahi whakawhanake otinga mēnā ka āta whakaaturia ngā whakaaro kia mārama tonu ki ngā rōpū mātāmua e whai wāhi mai ana, me te whakamahi i ngā hoahoa me ērā atu tikanga ataata hei whakawhiti whakaaro.

Tēnā kia whāiti te titiro ki ngā kōrero me te kōpae ataata mō te inenga koiora.

Whakaarohia te otinga o te whakawhanake hangarau e taea ai te ine ngā āhuatanga tinana (pērā i te pūrere tapumati, i te matawai mata-ā-ruru), me te putunga raraunga ka hua ake.

Ki ō whakaaro, e hāngai pū ana te otinga ki te mahi i whakaritea kia tutuki i a ia i te tohutohu? Me hoki ki te pānui i ngā kōrero mō te tārai tohutohu, ka whai ki te āta tūhono i te otinga ki te mahi i tohua māna.

Ka pēhea te whakanoho i te whakapapa hei putunga raraunga? Ki ō whakaaro kei te hāngai pū te putunga whakapapa ki te kaupapa i whakaritea i ngā tohutohu?

I ēnei tauira e rua, kei te kite koe i ētahi whakaaro hoahoa auaha, me te whakawhāititanga o aua whakaaro nā runga i ngā kitenga o ngā mahi rangahau? Whakaarohia te taha whakaatu me te taha pupuri i ngā whakapapa, me te hanganga o tētahi pūrere inenga koiora.

Me haere ki hea ki te kimi i ngā kōrero rangahau mō ngā pūrere inenga koiora, mō ngā whakapapa rānei kua whakaurua ki te putunga raraunga? Me pēhea koe e mōhio ai e pono ana ngā kitenga o te rangahautanga?

I pēhea te whakamātau a ngā kaihanganga pūrere inenga koiora i te otinga i hiahia rā rātou kia puta? Ko wai mā i uiuitia mō te otinga i hiahia rātou kia puta? Ko wai mā te hunga e tika ana kia uiuitia?

Ko te otinga e kōrerotia ake nei, he taonga, he pūnaha rānei, ko ngā mea e rua rānei?

He aha ētahi otinga waenga e taea ana mō tēnā, mō tēnā?

Ki tō titiro, he hātepe hangarau te huringa o ngā whakapapa hei putunga raraunga? Whakamāramatia tō whakautu.

He Kupu Taka

arotakenga	<i>evaluation</i>	tohutohu kua oti te tārai	<i>formalised brief</i>
e hāngai pū ana ki te mahi	<i>fitness for purpose</i>	whakaahua hukihuki o te huatau	<i>concept sketch</i>
otinga hangarau	<i>technological outcome</i>	whakaaritanga ā-rorohiko	<i>computer simulation</i>
rangahau mēnā ka taea	<i>feasibility study</i>	whakaaro auaha	<i>creative thinking</i>
takahanga whakamātau	<i>trialling</i>	whakamaunga	<i>ultimate endpoint</i>
tauira pakupaku	<i>scale model</i>	whanaketanga	<i>development</i>
tauira taketake	<i>prototype</i>		

Ngā āhuatanga matua o te hangarau me ngā otinga hangarau

Ngā āhuatanga o te hangarau

Ko te hangarau tētahi o ngā kawenga ahurei a ngāi tāua. He pānga nui whakaharahara ōna ki te ao e noho nei tātou, me te āhua tonu o tā tātou noho ki te ao. He whāinga kei te tūāpapa o ngā mahi hangarau, ā, he haere kōtui te hangarau ki ngā āhuatanga pāpori me ngā āhuatanga ahurea. Nō reira ko ngā kawenga, arā, ko ngā whakaharatau hangarau te hua o te kōkiri a te tangata i ngā hiahia me ngā koronga. Ka hua ake te otinga i te tukanga hoahoa i āta whakaarohia, i āta tāraia, kāore i pōkerekēhū noa te puta ake.

Mā te hangarau ka kaha ake te āhei o te tangata ki te huri i ngā matū, i ngā pūngao, me ngā mōhiohio.



He auaha tonu te āhua o te whakaaro me te mahi a te ringa hangarau. Me āta wānanga e ia ōna whakaaro tīmatanga me ōna huatau hoahoa. Me whakaaro arohaehae ki āna mahi, ka tuketuke i ngā pou aronui, ka ako mai i ngā mahi o mua, ka āta whakaaro anō ki ngā rā kei tua, i a ia e whakawhanake ana i ōna whakaaro. Ā, me whai whakaaro anō ia mēnā ka taea anō te mea e whāia ana e ia, mēnā rānei ka paingia, ka pīrangitia taua mea.

Me aro anō te ringa hangarau ki te hanga whakatau i runga i te whakaaro whaitake, i te āta wānanga. E rua ngā momo āta wānanga, ko te āta wānanga taha whakatinana, me te āta wānanga taha painga. Ko te taha whakatinana, e anga ana ki te āhua o te kawae i tētahi mahi e tutuki pai ai. Ko te taha painga, e anga ana ki tērā e tika ana, i runga i te aro nui ki ngā āhuatanga pāpori, ngā āhuatanga matatika, ngā āhuatanga ahurea. Ka arotahingia te mea e “tika” ana, e “hē” ana rānei; e “pai” ana, e “kino” ana rānei; ki te mea e whai uara ana, e uara kore ana rānei. Heoi anō, katoa ēnei, kei te āhua tonu o te titiro a te tangata nāna ngā whakatau – ōna uara, ōna whakapono, ōna māramatanga, ōna mōhiotanga.

Ko tā te hangarau, he whakamahi i te mātauranga hangarau, he whakaputa anō i te mātauranga hangarau hou. Kei te rere tahi te mātauranga hangarau me te taha whakatinana, ā, ka whai mana taua mātauranga ina kawea ake e te hāpori hangarau hei whakatinana i tētahi otinga. Heoi anō, ehara i te mea ka puta he otinga hangarau i ngā whakaharatau hangarau katoa. He wā anō e whakaata kē ana te mea ka puta ake i ngā whakatau katoa i tatū taka mai ki tērā wā.

E hono tahi ana te hangarau ki ngā āhuatanga me ngā pūnaha whakaaro o roto i ngā tau, ki ngā pānga pāpori, me ngā pānga ahurea. He awe nui tō ēnei mea katoa ki ngā hangarau ka whanake ake, me te āhua tonu o te whanake ake o aua hangarau.

E tutuki pai ai te whakaharatau hangarau, me nanao atu te hinengaro ki ngā mātauranga hangarau me ngā mātauranga o kaupapa kē, pērā i te pūtaiao, i te pāngarau. Nō reira, he wā anō me mahi tahi ngā ringa hangarau ki ngā tohunga o ērā atu kaupeka mātauranga.

Ngā āhuatanga o ngā otinga hangarau

Ko te otinga hangarau, he taonga ka taea e te ringa te whāwhā, he pūnaha rānei i waihangatia mā roto i te whakaharatau hangarau, hei whakatutuki i tētahi mahi, ā, ka tū mai ki tōna wāhi e tika ana. Ka arotakea i runga anō i tōna pai ki te kawae i te mahi i whakaritea māna. Ko te kōrero “ki tōna wāhi e tika ana”, e mea ana kei te whakamahia te otinga hangarau e te hāpori hangarau.

He tūātititini te hononga i waenga i ngā taonga hangarau me ngā pūnaha hangarau. Ka mutu, ko te whakatau he taonga rānei, he pūnaha rānei, kei te āhua tonu o te titiro ki taua mea. Hei tauira, ka taea te kī he pūnaha te waea pūkoro, ka taea anō te kī he taonga.

He otinga hangarau ngā mea o te ao mariko (pērā i te pūmanawa rorohiko, i te whakaahua ā-mati, i te aha atu), tae atu ki ngā hanga e taea ana te whāwhā ki te ringa (pērā i te rorohiko, i te arawhiti, i te waka, i te rongoā, i te aha atu).

He hanga “matarua” te otinga hangarau. He āhua taha ōkiko tōna, arā, ko tana hanga tonu tērā – ā-waho, ā-roto. He āhua whakatinana anō tōna, arā, ko ngā mahi ka taea e ia. Me mōhio te ringa hangarau ki ēnei mata e rua, me te hononga i waenganui, e tutuki pai ai tana whakaharatau hangarau.

Hei tārua ake i ēnei kōrero o runga ake, ka taea te whakaahua te otinga hangarau i runga i ōna āhuatanga ōkiko, i ōna āhuatanga whakatinana, otirā, me te whai whakaaro anō ki ngā āhuatanga pāpori me ngā āhuatanga nui kua pā i roto i ngā tau.

Kia whāiti anō te titiro ki te hanganga o tētahi pūrere hei ine i tētahi āhuatanga tinana, ki te hanganga rānei o tētahi putunga raraunga (hei tauira, te whakapapa), pērā i ērā e kitea ana i te kōpae ataata mō tēnei kaupapa. Me āta whai whakaaro anō ki ngā āhuatanga o te hangarau kua kōrerotia i runga ake nei. Ko ngā pātai i raro nei hei ārahi i ō whiriwhiringa.

He pānga anō ō ēnei tūmomo kawenga ki te āhua o tā tātou noho ki te ao, o te noho rānei a ētahi atu ki te ao?

- He tāngata tonu kei te kōkiri i te kaupapa?
- I hua ake te kaupapa i ētahi āhuatanga pāpori, i ētahi āhuatanga ahurea?
- Kimihia te tikanga o tēnei, me te whakahāngai i te whakamāoritanga ki te pūrere, ki te putunga raraunga rānei.
 - He rerekē anō te āhua o te titiro ki te pūrere e tū motuhake ana, me te putunga raraunga e noho ana hei haupū kōrero mō te tini tāngata?
 - He aha te hiahia pāpori ki ēnei mea e rua? Nō wai te hiahia?
 - He aha te hiahia ahurea? Nō wai te hiahia?

He māmā te kite atu i āta whāia he tukanga hoahoa mō te pūrere.

- Koirā anō te āhua mō te putunga raraunga?

Arā ētahi tauira o te whakaaro arohaehae i roto i te hanganga o te pūrere me te putunga raraunga. Matapakihia ēnei.

- Ki ō whakaaro, he pēhea nei te rahi o te tiro whakamuri me te aro whakamua e tutuki ai ēnei kaupapa?
- He wā anō kua tata te whātoro atu ki tua o ngā mea e mōhiotia ana, e whakaaetia ana rānei e tutuki ai te kaupapa?

Kimihia te roanga atu o ngā kōrero mō ēnei mea e rua:

- āe rānei ka taea, ka tutuki te kaupapa?
- āe rānei ka paingia, ka pīrangitia e te iwi nui tonu?

Whakahāngaitia ēnei pātai ki te pūrere ine me te putunga raraunga.

- Me pēhea koe e mōhio ai mēnā ka tū tonu, ka tōtika tonu tētahi mea, ahakoa pēhea?
- Ka pūmau tonu tana mahi tika i te mahi?
- Āe rānei ka taea te whakatū ahakoa ngā here, ngā whakararu tērā ka pāpā mai? (Hei tauira, ka taea anō mēnā he tino taumaha te utu waihanga?)
- Ka pēhea mēnā he tokomaha tonu ngā tāngata i te hāpori kāore e pai ki te mea e hangaia ana? Ka pēhea mēnā kāore e tino ngata ngā hiahia o te hāpori i taua hanga?

Ko tētahi atu āhuatanga nui o te hangarau, ko te hanga whakatau i runga i te whakaaro whaitake, i te āta wānanga. Kimihia ngā wāhi i tū ai te āta wānanga taha whakatinana i roto i tēnei kaupapa. He māmā ake te whai haere i te wānanga taha whakatinana, i te mea e aro ana ki ngā pātai me pēhea e tutuki ai tētahi mea, ā, he aha i tutuki ai tētahi mea.

He rehurehu ake te āta wānanga taha painga, i te mea ka uru mai ko ngā whakaaro o ētahi atu. Ka oti i te tangata he whakatau i runga anō i te āhua o ōna uara, ōna whakapono, ōna māramatanga, ōna mōhiotanga, ā, e kore pea tātou e mōhio pū ki ēnei āhuatanga i ētahi atu – he kokonga ngākau, he kokonga hinengaro e kore e kitea!



Ko ngā pātai i te tūtohi nei hei ārahi i a koe ki te wherawhera i te āta wānanga taha painga:

Koinei ngā momo pātai ka tirohia i raro i te wānanga taha painga:

E tika ana anō kia mahia te mahi nei? >	Mā tēnei pātai ka taea te parahau te hangarau i runga anō i ngā āhuatanga pāpori, ngā āhuatanga matatika, ngā āhuatanga tikanga ā-iwi.
Hei whakautu i te pātai i runga ake, me whai whakaaro anō ki ēnei pātai. >	He aha tēnei mea te tika, tēnei mea te hē? He aha tēnei mea te pai, tēnei mea te kino? He aha ngā mea e whai uara ana, he aha ngā mea kāore e whai uara ana?

Ko ngā whakautu ki ēnei pātai katoa, kei te āhua tonu o te tangata, ōna uara, ōna whakapono, ōna māramatanga, ōna pūkenga.

- Ka rerekē anō ngā uara, ngā whakapono, ngā māramatanga o te tangata Māori, tēnā i ērā o te tangata ehara i te Māori?
- Ka pēhea mō ētahi atu momo putunga raraunga?
- Ka ōrite te wānanga taha painga a te tangata kāore i Māori ki tāu wānanga i ngā painga mō te wāhi ki te whakapapa?

E tika ana kia taea e te otinga hangarau te mahi i whakaritea māna, i te wāhi e tika ana mōna. Kāore he take mēnā ka tika te mahi i tētahi wāhi, kāore i tētahi atu. Me pēhea koe e mōhio ai mēnā e eke ana i te pūrere, i te putunga raraunga rānei ngā paearu kua whakaritea mōna? He māmā pea te whakatau iho mēnā ka taea e te pūrere te mahi kua whakaritea māna, engari ka pērā anō te māmā mō te putunga raraunga mō te whakapapa?

Ahakoa he rerekē te taonga hangarau i te pūnaha hangarau, he wā anō ka haere kōtui ēnei mea e rua i te otinga hangarau kotahi. E mārama ana te kite he taonga tonu te pūrere, engari ka pēhea te putunga raraunga? Āe rānei he taonga, he pūnaha anō hoki?

Āta whakaarohia ngā āhuatanga ōkiko me ngā āhuatanga whakatinana o te pūrere ine me te putunga raraunga. Whakaahuatia te otinga hangarau i runga anō i te āhua o ēnei āhuatanga, kātahi ka tuitui atu ki te horopaki pāpori me te horopaki aro whakamuri e hāngai ana.

Hei tauira, whāia tētahi ara whakaaro pēnei nā:

He mea hanga te matawai mata ā-ruru ki _____, _____, nā runga i te hiahia o te hāpori ki _____, kia taea ai e rātou _____.

Whakakīia ngā wāhi wātea ki ēnei kōrero:

- ngā rawa hanga pūrere, hanga whakaahua
- hei hopu whakaahua o te mata ā-ruru tangata
- kia whakaūngia, kia whakatūtutia te tuakiri o te tangata
- te kuhu atu ngā wāhi e kore e taea e te katoa, tae atu ki ngā ara hei tango i ā rātou moni

Anei anō he tauira o tētahi ara whakaaro ka taea:

He mea hanga te whakapapa ki _____, _____, nā runga i te hiahia o te iwi Māori ki _____, kia taea ai e rātou _____.

Whakakīia ngā wāhi wātea ki ēnei kōrero:

- tētahi papatono rorohiko, ka tuhia rānei ki te pepa
- hei pupuri i ngā whakapapa

- tētahi huarahi e tautohua ai rātou i runga i te āhua o te noho whanaunga ki ētahi atu o te whānau, o te hapū, o te iwi
- te whakaatu ko wai rātou, nō hea rātou, me te kimi i ngā hononga ki ētahi atu tāngata, ki ētahi atu whakapapa

He Kupu Taka

āhua taha ōkiko	<i>physical nature</i>	mahi i whakaritea māna	<i>fitness for purpose</i>
āhua taha whakatinana	<i>functional nature</i>	mariko	<i>virtual</i>
āhuatanga ahurea	<i>cultural features</i>	matarua	<i>dual nature</i>
āhuatanga matua	<i>key characteristic/feature</i>	mātauranga hangarau	<i>technological knowledge</i>
āhuatanga ōkiko	<i>physical properties</i>	otinga hangarau	<i>technological outcome</i>
āhuatanga pāpori	<i>social features</i>	pūnaha	<i>system</i>
āhuatanga whakatinana	<i>functional properties</i>	taonga hangarau	<i>technological product</i>
hapori hangarau	<i>technological community</i>	tūānitini	<i>complex</i>
huatau hoahoa	<i>design concept</i>	tukanga hoahoa	<i>design process</i>
huri i ngā matū, i ngā pūngao, me ngā mōhiotio	<i>transform materials, energy, and information</i>	wāhi e tika ana	<i>in situ</i>
kawenga	<i>activity</i>	wānanga taha painga	<i>practical reasoning</i>
mahi	<i>function</i>	wānanga taha whakatinana	<i>functional reasoning</i>
		whakaaro arohaehae	<i>think critically</i>

Ngā tauira, ngā taonga, me ngā pūnaha hangarau

Te whakatauiranga hangarau

Ko tēnei mea te tauira, he whakaaturanga o tētahi mea tūturu. I te ao hangarau, whakamahia ai te tauira hei whakaatu ka pēhea te āhua o tētahi mea mēnā ka whāia tonutia tētahi whakawhanaketanga hangarau. Nā runga i aua whakaaturanga, kua pai te whakatau iho me haere tonu, hei aha noa iho rānei, me whakarerekē rānei tētahi āhuatanga.

He taputapu whakawhanake matua te whakatauiranga hangarau i ngā pekanga hangarau katoa. Ahakoa he rerekē ngā mātauranga e noho tūāpapa mai ana ki ngā tauira o tēnā pekanga, o tēnā pekanga, e ōrite ana ngā huatau whānui. Hei tauira, he rerekē te tūāpapa mātauranga o te tauira i te hangarau koiora, tēnā i te tauira i te pekanga hoahoa whare.

Ko ngā poutoko o te whakatauiranga hangarau, ko te wānanga taha whakatinana, me te wānanga taha painga. Ko te wānanga taha whakatinana, e arotahi ana ki ēnei āhuatanga: “Ka taea te whakatutuki?” me “Me pēhea te whakatutuki haere?”. Ko te wānanga taha painga, e pātai kē ana i te pātai “e tika ana anō kia whāia tēnei huarahi?” Arā, e arotahi ana ki ngā āhuatanga pāpori, ngā āhuatanga matatika. Mā te kuhu atu i ngā momo wānanga e rua ki ngā mahi whakatauiranga hangarau, ka oti mai he arotakenga kauawhi whānui o te taonga hangarau me tōna pānga ki te ao.

Ka tīmata mai pea ngā mahi whakatauiranga i te whakaaro noa iho, me te whakawhitinga kōrero ki ētahi atu ringa hangarau. Kātahi ka hangaia pea he tauira 3-D, he tuhinga rānei ki te pepa, ki te rorohiko rānei. Nāwai ā, ka tata ake ngā rawa ka whakamahia mō te tauira ki ērā ka whakamahia hei hanga i te taonga whakamutunga. Ā, mō te tauira taketake, ka whakamahia ngā rawa tūturu.



E rua ngā momo whakatauirā: ko te whakatauirā kawenga, me te hanga tauira taketake.

Ko te whāinga o te whakatauirā kawenga, he torotoro, he arotake i tētahi huatau hoahoa, nō reira ka kaha te whāia o tēnei momo whakatauirā i ngā takahanga tīmatanga o te whakaharatau hangarau. Ka kaha anō te whakawhirinaki ki te whakapae me te whakatau tata i ngā takahanga tīmatanga, i runga i ngā wheako kua puta ake i ētahi atu kaupapa. Mā te whakatauirā kawenga, tērā ka iti ake te moumou rawa, ā, ka mōhio mārire te ringa hangarau ka puta te taonga me te pānga ki te ao e āta hiahia ana ia kia puta.

Hangaia ai he tauira taketake hei arotake i te hāngai o tētahi taonga hangarau ki te mahi i whakaritea māna. Nō reira, ka puta te taonga, ā, ka haere ngā mahi whakatauirā taketake kia kitea ngā taunakitanga hei hanga whakatau i runga i te mōhio, e pai ake ai te taonga. Ko te arotakenga o te hāngai o te taonga ki te kaupapa i hangaia ai, ka inea i runga i te āhua o ngā whakatakotoranga whāiti e mau mai ana ki ngā tohutohu.

Pērā anō i ngā mahi whakatauirā kawenga, nā runga i ngā whakatau ka puta ake i te whakatauirā taketake, tērā ka turakina, ka whāmutua te kaupapa, tērā rānei ka kuhuna atu ētahi whakarerekētanga nui tonu.

Tēnā kia whāiti te titiro ki te kaupapa nei, ki a "Nō hea koe, ko wai koe?"

- He aha, ki ō whakaaro, ngā momo whakatauirā i whāia hei whakawhanake i tēnā, i tēnā momo pūrere ine i ngā āhuatanga tangata?
- Kōwhiria tētahi momo pūrere kotahi nei, ka whiriwhiri he aha ngā take me mātua kawē ētahi mahi whakatauirā mō taua pūrere.
 - Ko te whakatauirā taha whakatinana, ko te whakatauirā taha painga rānei te mea e tino hāngai ana?
 - He aha ngā take i whāia ai tēnā me tēnā momo?
 - He rerekē anō ngā momo whakatauirā i whāia i tēnā takahanga, i tēnā takahanga o te ara whakawhanake? He aha i pērā ai?

Whakakīia te tūtohi e whai ake nei hei whakaatu i te momo wānanga tērā i noho tūāpapa mai ki ngā mahi whakatauirā i kawea mō te pūrere kua kōwhiria e koe:

Te momo whakatauirā	Te wānanga taha whakatinana	Te wānanga taha painga

He wā anō, ki ō whakaaro, i tūpono ai rātou ki tētahi raruraru i whāmutua ai te kaupapa, i kuhuna ai rānei ētahi whakarerekētanga nui? Whakaahuatia ēnei raruraru.

Whāia anō ngā mahi whiriwhiri o runga ake nei mō te wāhi ki tētahi putunga kōrero hei pupuri i tētahi mea pēnei i te whakapapa.

- He aha te take me whakatauirā te whakapapa?
 - Ka pēhea te āhua o te whakatauirā?
 - Ka whakaaturia ēnei mahi whakatauirā ki a wai?
- Ka taea te whakakī te tūtohi i runga nei mēnā ko te whakapapa, ko tētahi atu momo putunga raraunga rānei te kaupapa?

Ngā taonga hangarau

Ko te taonga hangarau, he mea e taea ana te whāwhā, ā, nā te hoahoa tangata, nā te ringa tangata i puta ai ki te ao.

He mea nui kia mārama te tangata ki te hononga i waenga i ngā āhuatanga o ngā matū me te whakamahinga o te matū, e mārama ai ia ki tētahi taonga hangarau, ā, me pēhea te waihanga i taua taonga. Ka uru mai ki te karangatanga “taonga hangarau” ngā mea kikokiko tonu, pērā i te whakaahua ka tāia ki te pepa, tae atu ki ērā o te ao mariko, pērā i te whakaahua ā-mati e noho ana ki te rorohiko, ki te kōpae rānei.

Ko te mātauranga e noho tūāpapa mai ana ki ngā ariā mō ngā āhuatanga o te matū, tae atu ki te hanganga me te whakamahinga o ngā matū, kei te āhua tonu o ngā matū ka whakamahia hei hanga i tētahi taonga. Hei tauira, ko ngā māramatanga hei whakanao i tētahi kai, ka rerekē i ērā hei hanga i te papanga, i te taonga tāhiko rānei.

Nō te ao hou nei te hangarau matū. Heoi, kei te toro atu ōna kawekawe ki ētahi atu rerenga mātauranga kua roa e tū ana, e taea ai te huhua noa o ngā kawenga matū me ngā taonga matū whakahirahira tonu. Hei tauira, ko te aranga ake o ngā matū me ngā papanga “ihumanea”, arā, ko ngā matū ka urutau atu, ka urupare atu ki tētahi akiaki o waho, he akiaki hangarau tonu pea, he akiaki rānei nā te tangata. Nā te akiaki o waho, ka rerekē tētahi āhuatanga o roto i te matū, tana mahi rānei. Ko ētahi tauira o ngā taonga ka mahia ki te matū ihumanea, ko ngā kākahu aro ki te pāmahana, ko te papanga ka horoi i a ia anō, ko ngā mōwhiti aro ki te aho, me ngā uaua horihori.

Ko tētahi arotahinga nui o tēnei wāhanga, ko te pānga o te whakamahinga, te huringa, te hanganga rānei o te matū ki ngā huringa taonga me ngā mahi whakatina i ngā rawa. Mā konei e pakari ai te māramatanga hangarau ki te toitūtanga mō te wāhi ki te whakahaere rawa, ngā huringa taonga, me te porowhiuwhiu taonga.

Kia hoki ake anō ki ngā kōrero o *Nō Hea Koe, Ko Wai Koe?*

- He aha ngā taonga hangarau?
- Whakaarohia ake tētahi pūrere kotahi whakamahia ai hei ine i tētahi āhuatanga tangata. Whiriwhiria ngā āhuatanga o ngā matū ka whakamahia, ā, ka pēhea te whakamahi, hei hanga i te taonga.

Whakakīia he tūtohi pēnei i tēnei i raro nei hei ārahi i ō whiriwhiringa.

Te taonga	Ōna āhuatanga – āe, kāore rānei?	Whakamārama
I hangaia ki tētahi momo matū?		
Nā te hoahoa tangata i puta ai ki te ao?		
He hononga anō kei waenga i ngā āhuatanga o aua matū me te āhua o te whakamahi i ngā matū?		
He taonga kikokiko, nō te ao mariko rānei?		
He mātauranga anō e noho tūāpapa mai ana ki te whakamahinga o te matū hei hanga i te taonga?		

Ki ōu nā whakaaro, he taonga anō te putunga raraunga? (Mā te whakaoti i te tūtohi i runga nei ka māmā ake pea te whakautu i tēnei pātai.)



Ngā pūnaha hangarau

Ko te pūnaha hangarau, he huinga wāhanga e hono tahi ana, ko tāna mahi, he huri, he pupuri, he kawea, he whakatina rānei i te matū, i te pūngao, i te pārongo rānei.

Nā te hoahoa tangata, nā te ringa tangata i puta mai ai he pūnaha ki te ao, engari ina takoto he pūnaha, ka mutu i reira ngā mahi hoahoa a te tangata e tutuki ai i te pūnaha tāna mahi. Hei tauira, ina whakamahi te tangata i ngā pereki hei whakatū i tana waka (ka oti i a ia he mahi hei whakaara ake i te pūnaha), ehara i te mea me oti anō i taua tangata he mahi hoahoa e tika ai te mahi a te pūnaha whakatū a te waka.

Ko ngā mātauranga hangarau o tēnei wāhanga, ko te mārama ki ngā mea ka whakaurua, ngā putanga, ngā tukanga hurihanga, me te whakatina. Ko te mārama anō ki te tikanga o te “pouaka pango” tētahi mea ka tirohia.

Arā ētahi o ngā mea ka whakaurua, ko te tangata, ko ngā taonga hangarau, ko te moni, ko te rawa māori, ko te pārongo, ko te pūngao. Ko te tino putanga, ko te otinga e tika ana kia otinga ake i te pūnaha. Hei tauira, ko te putanga o tētahi pūnaha whakanao hēki Aranga, he matū ka hurihia, arā, ko te hēki tonu. Ko te putanga o tētahi pūnaha whakapāpā ā-waea, ko te pārongo ka hurihia, ka kawea, arā, ko te reo ka kawea, ka pā atu ki wāhi kē.

Ko ngā tukanga hurihanga, ko ngā tukanga o roto i tētahi pūnaha e āta hurihia ai ngā mea ka whakaurua hei putanga, me te ū ki tērā i whakaarohia e te tangata mō te pūnaha ka tahi, e kore ai te tangata e mate ki te mahi hoahoa atu anō ka rua.

Arā ētahi huatau i roto i te hoahoanga me te kawenga o te pūnaha hangarau e tika ana kia tūhuratia. Ko ētahi, ko te piki kawenga, ko te tōtika o te mahi, me te pouaka pango.

Ko ētahi, ko te piki kawenga me te tōtika o te mahi.

Ko te hoatu i tētahi momo tāpiritanga ki te pūnaha hei āhuetanga haumaruru, hei “ora kāinga rua”. Ko te tōtika o te mahi, ko te ū tonu o ngā wāhanga o te pūnaha ki te mahi i whakaritea mā tēnā, mā tēnā, mō te wā e tika ana. He mea nui te tōtika o te mahi me te piki kawenga i te ahumahi rererangi.

Ko ngā pūnaha whakanao manomano hei tauira o te pūnaha kua nui ōna pānga ki te ao. Kua noho ko te pouaka pango tētahi wāhanga o ngā pūnaha whakanao o ēnei rā. He wā anō he pūnaha iti te pouaka pango nō te pūnaha nui ake.

Ā tēnā, whiriwhiria mēnā he tukanga hangarau ka whāia hei waihanga i ngā pūrere inenga koirā. Tērā tonu pea he pūnaha hangarau e whai wāhi mai ana ki te hanganga o ēnei taonga, i te mea he taonga wāhanga rau.

Kei te rite ēnei āhuetanga katoa:

- He huinga wāhanga e hono tahi ana?
- E uru mai ana he matū, he pūngao, he pārongo rānei?
- Nā te hoahoa tangata, nā te ringa tangata i puta ai ki te ao?
- He tūāpapa mātauranga hangarau tōna?
- He mea anō ka whakaurua atu?
- He mea anō ka puta mai?
- Kei konā ōna anō tukanga panoni?
- Kei konā ōna anō tukanga whakatina?
- He pūnaha pouaka pango tōna?

Hangaia he tūtohi hei whakaatu i ngā āhuatanga i runga ake nei mō tēnā, mō tēnā pūnaha ka tautohua e koe, e puta ai aua pūrere inenga koiora. Ki tō titiro, he pūnaha whakanao te waihanga pūrere inenga koiora?

Hei āwhina i a koe, kimihia ngā kōrero mō ētahi atu pūnaha whakanao e kitea nuitia ana, hei tauira, ko ērā e noho mai ai he pouaka pango. Kua tautohua e koe tētahi pouaka pango e whakamahia ana i roto i te hanganga o ngā pūrere inenga koiora?

He Kupu Taka

e uru mai ana he matū, he pūngao, he pārongo rānei	<i>involving materials, energy, or information</i>	ngā tauira, ngā taonga, me ngā pūnaha hangarau	<i>technological models, products, and systems</i>
hangarau matū	<i>materials technology</i>	papanga ka horoi i a ia anō	<i>self cleaning textiles</i>
he mea anō ka puta mai	<i>has outputs</i>	piki kawenga	<i>redundancy</i>
he mea anō ka whakaurua atu	<i>has inputs</i>	porowhiuwhiu taonga	<i>product disposal</i>
he tūāpapa mātauranga hangarau tōna	<i>identified technological knowledge base</i>	pouaka pango	<i>black box</i>
hoahoa tangata	<i>human design</i>	pūnaha	<i>system</i>
huatau hoahoa	<i>design concept</i>	putanga	<i>output</i>
huatau whānui	<i>generic concept</i>	rawa māori	<i>raw material</i>
huinga wāhanga e hono tahi ana	<i>set of interconnected parts</i>	taonga matū	<i>material product</i>
huringa taonga	<i>product life cycle</i>	taputapu whakawhanake matua	<i>key development tool</i>
kākahu aro ki te pāmahana	<i>heat regulated clothing</i>	tauira taketake	<i>prototype</i>
kauawhi whānui	<i>holistic</i>	taunakitanga	<i>evidence</i>
kei konā ōna anō tukanga panoni	<i>has transformation processes</i>	toitūtanga	<i>sustainability</i>
kei konā ōna anō tukanga whakatina	<i>has control processes</i>	tōtika o te mahi	<i>reliability</i>
mahi i whakaritea māna	<i>fitness for purpose</i>	tukanga hurihanga	<i>transformation process</i>
mariko	<i>virtual</i>	uaua horihori	<i>artificial muscle</i>
matū "ihumanea"	<i>SMART materials</i>	urupare	<i>response</i>
mea whakaurua	<i>input</i>	urutau	<i>adapt</i>
mōwhiti aro ki te aho	<i>light responsive sunglasses</i>	wānanga taha painga	<i>practical reasoning</i>
nā te hoahoa tangata, nā te ringa tangata i puta ai ki te ao	<i>exists in the world as a result of human design</i>	wānanga taha whakatinana	<i>functional reasoning</i>
		whakanao	<i>production</i>
		whakanao manomano	<i>mass production</i>
		whakatauiria kawenga	<i>functional modelling</i>
		whakatina	<i>control</i>



Ngā Āhuatanga Hangarau

Āta whakaarohia ngā pūrere inenga koiora i kitea e koe i te kōpae ataata, i te pukapuka nei, tae atu ki ngā putunga raraunga pērā i te whakapapa. Whiriwhiria ngā pātai i raro nei. Mā te wānanga i ēnei pātai me te rapu i ngā whakautu, ka mārama ake koe ki ngā āhuatanga hangarau o te inenga koiora.

Ngā hiahia me ngā huarahi e wātea ana

Mā te tautohu i tētahi take me tōna horopaki e kitea ai ngā hiahia me ngā huarahi wātea tūturu. Ka noho ko taua hiahia, taua huarahi wātea rānei te whāinga whai takenga mō te whakawhanaketanga hangarau, ā, ka hāngai tonu, ka whāiti tonu ngā tohutohu ka takoto ki taua hiahia, ki taua huarahi rānei.

He aha te hiahia tūturu?

He aha te take e waihangatia ai te mea nei?

Mā wai e whakamahi?

He aha te huarahi e wātea ana?

I ōna wā maha, ko te mea ka taea e koe e pai ake ai te tutuki o te hiahia, koirā te huarahi wātea. Hei tauira, tērā pea ko te hiahia i konei, ko te tautohu i ngā tāngata ki tētahi pūrere kawekawe. Ko te huarahi wātea, ko te tautohu i ngā tāngata ki taua pūrere e kore ai rātou e whara, e raru.

He wā anō he maha ngā hiahia, i te mea he tokomaha ngā tāngata.

He aha ētahi o ngā mea kia āta whiriwhiria e ea ai ēnei hiahia huhua?

Te toitūtanga

He mea nui te toitūtanga. Ahakoa he aha te mahi i te ao nei, i runga i te kaupapa o te toitūtanga me mātua whai kia kaua e puta he hua kino i taua mahi ki a Papatūānuku, ki a Ranginui. Me āta penapena ngā rawa māori, me āta tiaki te taiao hei oranga, hei pārekarekatanga mā ngā uri whakaheke. I te wā ki ngā tūpuna, arā ngā tikanga pērā i te rāhui hei toitū i ngā rawa māori. He tikanga pai te rāhui e whakatina ai, e penapena ai ngā iwi i ā rātou rawa.

He aha ētahi o ngā āhuatanga e pā ana ki te toitūtanga?

Ka rerekē te āhua o tō titiro ki te pūrere, tēnā i te putunga raraunga. Hei tauira, tērā ka kīia te whakapapa he taonga toitū, i te mea ko ngā kōrero, ko ngā mātauranga o roto, kua pūmau mā ngā uri whakaheke.

Ko ngā āhuatanga toitū o ngā pūrere ine, ko ngā matū waihanga pea me ngā tukanga whakanao. Mēnā ka hangaia ki ngā matū rangitahi, ka porowhiua i muri i te tau kotahi, i ngā tau e rua rānei, e hāpai ana tērā i te toitūtanga?

He aha i noho ai ko ngā āhuatanga toitūtanga tētahi mea hei āta whiriwhiri mā ngā ringa whakawhanake hangarau?

Ngā mōhiotanga o ngā tūpuna

Kei ngā tūpuna ngā mōhiotanga, ngā pūkenga me ngā māramatanga ki tō rātou ao e noho ora ai rātou i Aotearoa i mua noa atu i te taenga mai o tauīwi. Ka mutu, i āta haere kōtui ērā āhuatanga me te taha wairua.

Kāore pea he wāhi ki ngā mōhiotanga o ngā tūpuna i roto i te hanganga o ngā pūrere. Heoi anō, he wāhi anō pea kei aua mātauranga ina kōwhiria he aha ngā pūrere ka hangaia i ngā rā kei te heke iho, ka pēhea te whakamahinga o ngā pūrere, he aha anō ngā wāhi e whakamahia ai. Me whai whakaaro ki ngā wāhi tapu o te tinana, pērā i te māhunga.

Ko te whakapapa, he putunga matauranga nā ngā tūpuna. Whiriwhiria he aha taua mātauranga, ā, ka pēhea te āhua o te whakamahi i taua mātauranga i roto i te hanganga o te whakapapa.

Ngā uara me ngā whakapono

I haere kōtui anō ngā mōhiotanga, ngā pūkenga me ngā māramatanga o ngā tūpuna ki ō ratou uara me ō rātou whakapono. E karapotī ana ēnei āhuatanga i ngā huatau pērā i te wairua, i te aroha, i te manaakitanga, i te kaitiakitanga, me ngā kawenga e tika ana, arā, ko ngā tikanga tonu ērā.

Whakaarohia ngā whakapono me ngā uara tērā e hono ana ki ngā mātauranga i whiriwhiria i te wāhanga o runga ake nei. Mō te wāhi ki te whakapapa, he maha ngā mea hei whiriwhiri, pērā i te whakapono he mauri tō ngā mea katoa.

Te pānga ki te iwi

He huhua tonu ngā pānga o te otinga hangarau ki te iwi, ki te hapori. Heoi anō, ko te tikanga, he pānga e taea ana te ine.

- Me pēhea te kimi mai i te pānga ki te iwi/hapori?

Arā tētahi huarahi, ko te uiui haere i ngā tāngata kua rongō i ētahi o aua pānga. Tērā pea ka whakatairitea ngā raraunga ka kohia i mua me ērā ka kohia i muri i te tatūnga o te otinga hangarau.

- I whai hua anō? He pēhea nei te kaha o te whai hua?

Whakaarohia te pānga o te pūrere, o te putunga raraunga, o te whakapapa rānei ki te tangata.

Ko wai mā te hunga mā rātou te hangarau nei? He mea nui ki te Māori te whakapapa – he puiaki te whakapapa ki a tātou. He aha i noho taonga ai? He pēhea nei te noho taonga mai?

Ko wai mā te hunga ka uaratia e rātou te pūrere inenga koiora? He pēhea te pānga o te pūrere nei ki a koe? Ka pēhea ngā kātīpa i ngā tomokanga ki te motu, te hunga rānei e tiaki ana i ō moni i te pēke?



Me pēhea e kimihiā ai ēnei pārongo, arā, ko ngā pānga me ngā hua o te otinga? Me puta rawa he otinga? Ki te kore, he aha te take i waihangatia ai?

I ēnei whiriwhiringa i ngā āhuatanga o te hangarau, ki ō whakaaro he otinga hangarau pai te pūrere inenga koiora, te putunga raraunga, te whakapapa rānei?

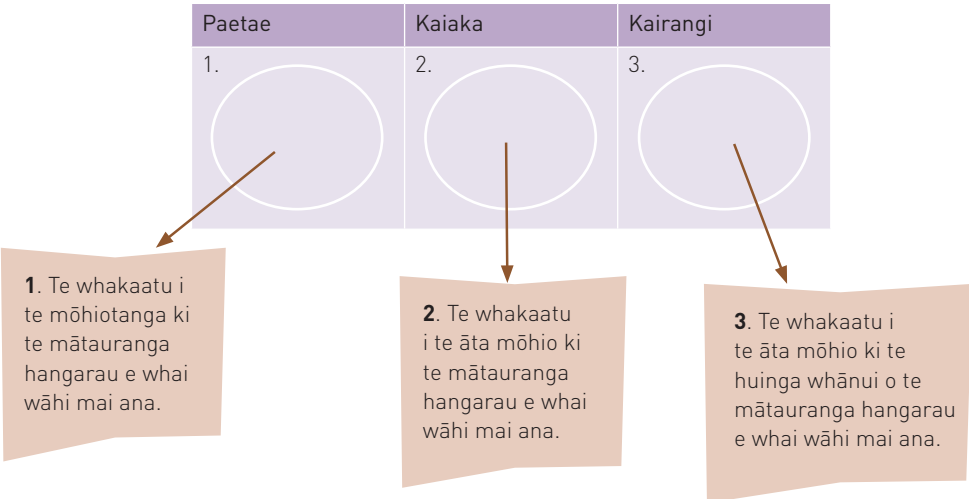
Te Aromatawai

He aromatawai i te tukanga hangarau me te whakamahi anō i ngā paerewa paetae

Paerewa Paetae 90049 (hei tauira)

Te whakaatu mōhiotanga ki te mātauranga hangarau.

Paearu Paetae



Paerewa Paetae 90049: Te whakaatu mōhiotanga ki te mātauranga hangarau

Ko tā ngā Paerewa Paetae, he āta whakaatu he aha ngā mea kia tutuki e kīia ai kua “eke paetae”, kua “eke kaiaka”, kua “eke kairangi” rānei te ākongā ki tēnā, ki tēnā paearu ka whakarārangitia. Ko te “eke paetae” e tohu ana ka taea e te ākongā te mea e tohua ana i te taitara o te paerewa. I konei, ki te kīia kua eke paetae koe, e tohu ana tērā ka taea e koe te whakaatu i tō mārama ki te mātauranga hangarau. Ko te kaiaka, e tohu ana kua neke atu i tērā te pai o tō kawē i ngā mahi, ā, ko te kairangi, koirā te mea pai katoa ka taea. (Kei raro nei te roanga atu o ngā kōrero mō tēnā, mō tēnā.) He paerewa paetae mōwaho tēnei, nō reira mā tō kaiako koe e ārahi kia tutuki ai i a koe ngā mea e tika ana. Ka roa tonu pea koe e kohikohi ana i ngā taunakitanga e rite ana mō tēnei paerewa paetae.

E eke paetae ai koe, me tutuki pai i a koe:

- te whakaatu i tō mārama ki te mātauranga hangarau e hāngai ana.

Ko te mātauranga hangarau e hāngai ana, ko tērā e kawea ai te whakaharatau hangarau i runga i te mārama, i te mōhio. Ka uru mai ki roto i tēnei te mātauranga ā-ariā, arā, ko te mōhiotanga e pā ana ki te hangarau. Hei tauira, ko te mōhio ki te āhua o tētahi taonga, me ngā mātāpono e noho tūāpapa mai ana ki te āhua o tana mahi. Ko te mōhiotanga tukanga anō tētahi momo mātauranga hangarau, e mōhiotia ai me pēhea te mahi i tētahi mahi, te whakamahi rānei i tētahi hanga.

Mō te paerewa paetae 90046, ina mātakitaki koe i te kōpae ataata me te pānui i ngā kōrero e hāngai ana, mā tō kaiako koe e ārahi ki te whiriwhiri i tētahi mahi whakaharatau hangarau hei kawē māu, e pai ai tō whakaatu i tō mōhio ki ngā mātauranga hangarau e hāngai ana. Koia tērā ko te mātauranga e taea ai te whakaharatau hangarau i runga i te mārama, i te mōhio. He āwhina kei Te Anga Whakaū Māramatanga ki te Tukanga Hangarau mō tēnei mahi. Kōwhiria kia kotahi te momo hangarau, ka tūhura me te whai haere anō i ngā mea kua noho rārangi mai ki Te Anga. Hei tauira, ko tētahi o ngā hangarau hei tautohu i tētahi āhuatanga tinana, ko te waihangatanga rānei o tētahi putunga raraunga pērā i te whakapapa.

E eke kaiaka ai koe, me tutuki pai i a koe:

- te whakaatu i tō mārama hōhonu ki te mātauranga hangarau e hāngai ana.

Ko te rerekētanga o te eke paetae i te eke kaiaka, ko te hōhonu o te mārama.

E eke kairangi ai koe, me tutuki pai i a koe:

- te whakaatu tō mārama hōhonu ki te huhua tonu o ngā mātauranga hangarau e hāngai ana.

Ko te rerekētanga o te eke kaiaka i te eke kairangi, ko te hōhonu o te mārama ki te huhua o ngā mātauranga hangarau e hāngai ana.

He Kupu Taka

āta mōhio	<i>in-depth [knowledge]</i>	whai wāhi mai ana	<i>relevant</i>
huinga whānui	<i>wide range</i>	whakaatu	<i>demonstrate</i>
Paerewa Paetae	<i>Achievement Standard</i>		







He Kupu Taka

āhua ā-mahi	<i>technique</i>
arotake	<i>evaluate</i>
arotautanga	<i>optimisation</i>
auaha	<i>creative; innovative</i>
hangarau kai	<i>food technology</i>
hangarau koiora	<i>biotechnology</i>
hangarau whakatina	<i>control technology</i>
hapori	<i>community</i>
hinengaro auaha	<i>ingenuity</i>
hiranga	<i>excellence; superior</i>
hātepe/tukanga	<i>process</i>
hoahoa	<i>design</i>
huarahi wātea	<i>opportunity</i>
kaka-aku	<i>textile</i>
kawenga	<i>activity</i>
kiritaki	<i>customer; client</i>
kiriho	<i>plastic</i>
koiora	<i>biology</i>
konganuku	<i>metal</i>
korehāhā	<i>extinct</i>
kōwhiri	<i>select</i>
kounga	<i>quality</i>
māia	<i>confidence</i>
matatika	<i>ethics</i>
mātau	<i>know; understand</i>
matū	<i>material</i>
matū waihanga	<i>synthetic material</i>
mauroanga	<i>durable</i>
ohaoha	<i>economics</i>
pāpā	<i>impact</i>
pāpori	<i>social</i>

parahau	<i>justify</i>
paturopi	<i>antibiotics</i>
pūhanga manawa	<i>mechanical</i>
pūkenga whakahaere mahi	<i>project management skills</i>
pūnaha	<i>system</i>
rauropi	<i>living organism</i>
rautaki	<i>strategy</i>
rawa	<i>resource; material</i>
rawa ora	<i>living material</i>
rerehua	<i>aesthetics</i>
tāhiko	<i>electronics</i>
taukumekume	<i>debate</i>
tautohu	<i>identify</i>
tauwhāiti	<i>specific</i>
tikanga haumaruru	<i>safety procedure</i>
toitū	<i>lasting; sustainable</i>
tōrangapū	<i>political; politics</i>
tūhura	<i>explore; investigate</i>
tukanga/hātepe	<i>process</i>
tuku mōhiōhio	<i>information transfer</i>
urupare	<i>feedback; response</i>
utauta	<i>equipment</i>
whai kiko	<i>purposeful</i>
whai patanga	<i>purposeful; useful</i>
whaiaro	<i>personal</i>
whakaharatau hangarau	<i>technological practice</i>
whakahiato	<i>develop</i>
whakatairanga	<i>promote</i>
whakataurite	<i>compare</i>
whakawhanake	<i>develop</i>

He Kupu Āpiti

Kei raro nei ngā kōrero Ingarihi taketake mō ngā whakamāoritanga kua tohua i mua nei.

Koinei ngā whakamāramatanga Ingarihi taketake mō te “hangarau koiora” (whārangi 6):

1. “A measurable, physical characteristic or personal behaviour trait used to recognise the identity or verify the claimed identity, of an enrollee.” (Nā The Association for Biometrics [UK], tirohia te paetukutuku www.biometrie-online.net/dossiers/generalites/glossary.pdf).
2. “The automated use of physiological or behavioural characteristics to determine or verify identity.” (Nā The International Biometric Group, tirohia te paetukutuku www.unc.edu/~smithdr/inls187/biofuture.htm).

Koinei te whakamāramatanga Ingarihi taketake mō te kupu “whakapapa” kua whakamāoritia ki te whārangi 10:

3. “... the genealogical descent of all living things from the gods to the present time. Whakapapa is the basis for the organization of knowledge in respect to the creation and development of all things. It is through genealogy that kinship and economic ties are cemented and that the mana or power of a chief is inherited. Whakapapa is one of the most prized forms of knowledge and great efforts are made to preserve it. Whakapapa can be interpreted as the layering of generations upon one another, and through its recital (tātai) this is apparent.” (Summarised from Barlow) Barlow, C. (1991). Tikanga Whakaaro: Key Concepts in Māori Culture, Oxford University Press: Auckland.

