

Achievement Standard

Subject Reference	Mathematics and Statistics 1.11		
Title	Investigate bivariate numerical data using the statistical enquiry cycle		
Level	1	Credits	3
		Assessment	Internal
Subfield	Statistics and Probability		
Domain	Statistics		
Status	Registered	Status date	9 December 2010
Planned review date	31 December 2019	Date version published	20 November 2014

This achievement standard requires students to investigate bivariate numerical data using the statistical enquiry cycle.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Investigate bivariate numerical data using the statistical enquiry cycle. 	<ul style="list-style-type: none"> Investigate bivariate numerical data using the statistical enquiry cycle with justification. 	<ul style="list-style-type: none"> Investigate bivariate numerical data using the statistical enquiry cycle with statistical insight.

Explanatory Notes

- This achievement standard is derived from Level 6 of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, and is related to the material in the *Teaching and Learning Guide for Mathematics and Statistics*, Ministry of Education, 2010 at <http://seniorsecondary.tki.org.nz>. The achievement standard is aligned to the following achievement objectives taken from the Statistical Investigation thread of the Mathematics and Statistics learning area:
 - plan and conduct surveys and experiments using the statistical enquiry cycle
 - determining appropriate variables and measures
 - considering sources of variation
 - gathering and cleaning data
 - using multiple displays, and re-categorising data to find patterns and relationships, in multivariate data sets
 - presenting a report of findings;

- plan and conduct investigations using the statistical enquiry cycle:
 - justifying the variables and measures used
 - managing sources of variation including through the use of random sampling
 - identifying and communicating features in context (relationships between variables), using multiple displays
 - justifying findings, using displays and measures.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of the *Marautanga* achievement objectives to which this standard relates, see the [Māori version](#) of the standard.

- 2 *Using the statistical enquiry cycle* involves using each component of the statistical enquiry cycle to investigate bivariate numerical data.

Numerical data:

The x variable or explanatory variable may be a continuous or discrete numerical variable.

The y-variable or response variable must be a numerical variable where the numbers measure the quantity of interest.

Using the statistical enquiry cycle with justification involves linking aspects of the statistical enquiry cycle to the context and making supporting statements which refer to evidence such as summary statistics, data values, trends or features of visual displays.

Using the statistical enquiry cycle with statistical insight involves integrating statistical and contextual knowledge throughout the statistical enquiry cycle, and may involve reflecting on the process or considering other explanations for the findings.

- 3 Students need to be familiar with using the statistical enquiry cycle to investigate bivariate numerical data, which involves:
- planning and conducting an investigation using bivariate numerical data
 - working with a given relationship question
 - determining appropriate variables and measures
 - managing sources of variation
 - gathering data
 - selecting and using appropriate display(s)
 - communicating relationship(s) in the data in a conclusion.
- 4 Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>.

Replacement Information

This achievement standard and AS91035 replaced unit standard 5240 and AS90193.

Quality Assurance

- 1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.
- 2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference

0233

Paerewa Paetae

Aronga	Pāngarau 1.11		
Ingoa	Te whakamahi i ngā tikanga tūhuratanga tauanga hei tūhura raraunga tau matarua		
Kaupae	1	Whiwhinga	3
Marau akoranga	Te Marautanga o Aotearoa		
Kokonga akoranga	Pāngarau		
Mana rēhita	Kua rēhitatia	Te rā i mana ai	9 Hakihea 2010
Te rā e arotakengia ai	31 Hakihea 2016	Te rā i puta ai	12 Hakihea 2013

Te Hononga ki te Marautanga

I ahu mai tēnei paerewa paetae i te Taumata 6 o Te Marautanga o Aotearoa, i whakaputaina e Te Pou Taki Kōrero i te tau 2008.

Whāinga Paetae

Te Tauanga

- 1 *Ka whai i ngā tikanga mō te tūhuratanga tauanga ki te whakamahere, ki te whakatutuki tūhuratanga:*
- *ka parahau i ngā taurangi me ngā waeine;*
 - *ka whakatau i ngā pūtakenga o te taurangitanga, pērā i te whakamahi tīpako matapōkere;*
 - *ka whakamahi whakaari tauanga matatini ki te tautohu, ki te whakawhiti whakaaro mō ngā āhuatanga horopaki, pērā i te ia, ngā hononga taurangi, me ngā taurangitanga o roto, o waenganui hoki i ngā tuari raraunga;*
 - *ka whakaputa hīkaro ōpaki mō te taupori ka hua ake i ngā raraunga;*
 - *ka whakamahi whakaari raraunga me ngā waeine ki te parahau i ngā whakakitenga ka hua ake i te tūhuratanga;*
 - *ka mārama ki ngā tikanga matatika e hāngai ana.*

E hono ana ki te Papa Whakaako mō Pāngarau kei te pae ipurangi nei:

<http://tmoa.tki.org.nz/Te-Marautanga-o-Aotearoa/Taumata-Matauranga-a-Motu-Ka-Taea>.

Te Hononga ki *The New Zealand Curriculum* (NZC)

I ahu mai hoki tēnei paerewa paetae i *The New Zealand Curriculum*. Mō ngā kōrero e pā ana ki ngā whāinga paetae o te NZC e hāngai ana ki tēnei paerewa, tirohia te [putanga reo Pākehā](#) o te paerewa.

Te Hononga ki ngā Tikanga Aromatawai

Kei tēnei pae ipurangi ngā Tikanga Aromatawai mō tēnei paerewa paetae:

<http://tmoa.tki.org.nz/Te-Marautanga-o-Aotearoa/Taumata-Matauranga-a-Motu-Ka-Taea>.

Paerewa Paetae

<p>Paetae Te whakamahi i ngā tikanga tūhuratanga tauanga hei tūhura raraunga tau matarua.</p>	<p>Hei tohu i te paetae:</p> <ul style="list-style-type: none"> • ka whakamahi i ia wāhanga o ngā tikanga tūhuratanga tauanga hei tūhura raraunga tau matarua.
<p>Kaiaka He kaiaka te whakamahi i ngā tikanga tūhuratanga tauanga hei tūhura raraunga tau matarua.</p>	<p>Hei tohu i te kaiaka:</p> <ul style="list-style-type: none"> • Ko te parahau i ngā wāhanga o roto i ngā tikanga tūhuratanga tauanga te mea nui. Nō reira, ka kitea ēnei: <ul style="list-style-type: none"> – ka tūhono i ngā wāhanga o roto i ngā tikanga tūhuratanga tauanga ki te horopaki me te taupori – ka whakaputa kōrero taunaki, hei tauira: <ul style="list-style-type: none"> ○ ko ngā tātaitanga tauanga whakarāpopoto pērā i te toharite me te tau waenga ○ ko ngā uara raraunga ○ ko ngā ia me ngā āhuatanga kōhure o roto i ngā whakaari raraunga.
<p>Kairangi He kairangi te whakamahi i ngā tikanga tūhuratanga tauanga hei tūhura raraunga tau matarua.</p>	<p>Hei tohu i te kairangi:</p> <ul style="list-style-type: none"> • Ko te whakaatu aroā tauanga hōhono te mea nui. Nō reira, ka kitea ēnei: <ul style="list-style-type: none"> – ka kōtuitui i te mātauranga tauanga me te mārama ki te horopaki, i roto i ngā wāhanga katoa o te tūhuratanga tauanga – ka arohaehae i te tukanga tauanga me ngā whakamārama e hāngai ana ki ngā whakakitenga.

Kōrero Āpiti

1 E whai ake nei ko te whakamāramatanga o ngā kupu whaitake, kīanga rānei:

raraunga tau	<ul style="list-style-type: none"> • He taurangi tau motukore, he taurangi tau motumotu rānei te taurangi <i>x</i>, arā te taurangi rāwekeweke. • He taurangi tau te taurangi <i>y</i>, arā te taurangi whakamauru, ā, ko tāna he whakaatu i te kaha o te hononga ki te taurangi <i>x</i>, te taurangi rāwekeweke.
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2 Kia taunga te ākongā ki ngā tikanga mō te tūhuratanga tauanga hei tūhura raraunga tau matarua, arā:

- te whakamahere me te whakahaere i tētahi tūhuratanga e whai wāhi mai ana te raraunga tau matarua
- te tūhura i tētahi pātai e hāngai ana ki te pānga o tētahi taurangi ki tētahi
- te whiriwhiri i ngā taurangi me ngā tātaitanga tauanga e hāngai ana
- te whakatau i ngā pūtake o te taurangitanga
- te kohikohi raraunga
- te whiriwhiri me te whakamahi i ngā whakaari raraunga e hāngai ana

- te whakaputa whakataunga whakamutunga, me te whakawhiti kōrero mō ngā pānga o roto i ngā raraunga.

Kuputaka:

kōtuitui

integrate, connect

aroā tauanga hōhonu

statistical insight/understanding

parahau

justify

He Kōrero mō te Whakakapi

Koinei me te paerewa paetae 91035 hei whakakapi i te paerewa 5240 me te paerewa paetae 90193.

Tātari Kounga

- 1 Me mātua whakamana ngā Kaituku Akoranga me ngā Whakahaere Whakangungu Ahumahi e te Mana Tohu Mātauranga o Aotearoa ka rēhita ai i ngā hua ka puta mai i ngā aromatawai ki ngā paerewa paetae.
- 2 Ko ngā Kaituku Akoranga me ngā Whakahaere Whakangungu Ahumahi kua mana, ā, e aromatawai ana i ā rātou hōtaka ki ngā paerewa paetae, me uru rātou ki ngā pūnaha whakarite e tika ana mō aua paerewa paetae.

Ko te tohutoro ki te Mahere Whakamana, Whakaōritenga hoki

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