

## Achievement Standard

**Subject Reference** Mathematics and Statistics 1.5

**Title** Apply measurement in solving problems

**Level** 1      **Credits** 3      **Assessment** Internal

**Subfield** Mathematics

**Domain** Measurement

**Status** Registered      **Status date** 9 December 2010

**Planned review date** 31 December 2020      **Date version published** 20 November 2014

This achievement standard involves applying measurement in solving problems.

### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> <li>Apply measurement in solving problems.</li> </ul>	<ul style="list-style-type: none"> <li>Apply measurement, using relational thinking, in solving problems.</li> </ul>	<ul style="list-style-type: none"> <li>Apply measurement, using extended abstract thinking, in solving problems.</li> </ul>

### Explanatory Notes

- 1 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 following achievement objectives taken from the Measurement thread of the Mathematics and Statistics learning area are related to this standard:
- convert between metric units, using decimals
  - deduce and use formulae to find the perimeters and areas of polygons, and volumes of prisms
  - find the perimeters and areas of circles and composite shapes and the volumes of prisms, including cylinders
  - apply the relationships between units in the metric system, including the units for measuring different attributes and derived measures
  - calculate volumes, including prisms, pyramids, cones, and spheres, using formulae.

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 *Apply measurement* involves:

- selecting and using a range of methods in solving problems
- demonstrating knowledge of measurement concepts and terms
- communicating solutions which would usually require only one or two steps.

*Relational thinking* involves one or more of:

- selecting and carrying out a logical sequence of steps
- connecting different concepts and representations
- demonstrating understanding of concepts
- forming and using a model;

and also relating findings to a context, or communicating thinking using appropriate mathematical statements.

*Extended abstract thinking* involves one or more of:

- devising a strategy to investigate or solve a problem
- identifying relevant concepts in context
- developing a chain of logical reasoning, or proof
- forming a generalisation;

and also using correct mathematical statements, or communicating mathematical insight.

3 *Problems* are situations that provide opportunities to apply knowledge or understanding of mathematical concepts and procedures and methods. The situation will be set in a real-life or mathematical context.

4 The phrase 'a range of methods' indicates that evidence of the application of at least three different methods is required.

5 *Measurement* includes the use of standard international metric units for length, area, capacity, mass, temperature, and time. Measures include density, speed and other rates such as unit cost or fuel consumption.

6 Students need to be familiar with methods related to:

- perimeter
- area and surface area
- volume
- metric units.

7 Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>.

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### Replacement Information

This achievement standard replaced unit standard 5241 and AS90149.

**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

<b>Aronga</b>	Pāngarau 1.5		
<b>Ingoa</b>	Te whakamahi tikanga ine hei whakaoti rapanga		
<b>Kaupae</b>	1	<b>Whiwhinga</b>	3
		<b>Aromatawai</b>	Ā-roto
<b>Marau akoranga</b>	Te Marautanga o Aotearoa		
<b>Kokonga akoranga</b>	Pāngarau		
<b>Mana rēhita</b>	Kua rēhitatia	<b>Te rā i mana ai</b>	9 Hakihea 2010
<b>Te rā e arotakengia ai</b>	31 Hakihea 2020	<b>Te rā i puta ai</b>	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 Ine me te Āhuatanga, Te Ine*

- 2 *Ka whakamahi i ngā hononga o ngā waeine o te pūnaha ngahuru, tae atu ki ngā hononga o ngā waeine mō ngā āhuatanga rerekē.*
- 3 *Ka whakamahi ture tātai hei whiriwhiri i te rōrahi o ngā momo poro, ngā koeko me ngā poi.*

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><b>Paetae</b> Te whakamahi tikanga ine hei whakaoti rapanga.</p>	<p>Hei tohu i te paetae:</p> <ul style="list-style-type: none"> <li>• ka whiriwhiri, ka whakamahi i ētahi tikanga whānui hei whakaoti rapanga</li> <li>• ka whakaatu mōhiotanga ki ngā huatau ine me ngā kupu e hāngai ana</li> <li>• ka whakamārama i ngā otinga mēnā kotahi, e rua rānei ngā mahi o roto i te tikanga i whakamahia.</li> </ul>
<p><b>Kaiaka</b> He kaiaka te whakamahi tikanga ine hei whakaoti rapanga.</p>	<p>Hei tohu i te kaiaka:</p> <ul style="list-style-type: none"> <li>• Ko te whakaaro tūhonohono te mea nui. Arā, kia kotahi, nui ake rānei o ēnei: <ul style="list-style-type: none"> <li>– ka whiriwhiri, ka whakatutuki i te raupapatanga mahi arorau e hāngai ana</li> <li>– ka tūhono i ētahi huatau rerekē, ētahi whakaahuahanga rerekē rānei</li> <li>– ka whakaatu māramatanga ki ngā huatau e hāngai ana</li> <li>– ka hanga, ka whakamahi tauira.</li> </ul> </li> <li>• Ko te tūhono i ngā otinga ki tētahi horopaki, te whakamahi rānei i ngā kīanga pāngarau hei whakawhitiwhiti whakaaro.</li> </ul>
<p><b>Kairangi</b> He kairangi te whakamahi tikanga ine hei whakaoti rapanga.</p>	<p>Hei tohu i te kairangi:</p> <ul style="list-style-type: none"> <li>• Ko te whakaaro waitara te mea nui. Arā, kia kotahi, nui ake rānei o ēnei: <ul style="list-style-type: none"> <li>– ka waihanga rautaki hei tūhura, hei whakaoti rānei i tētahi rapanga</li> <li>– ka tautohu i ngā huatau e hāngai ana ki te horopaki</li> <li>– ka whakaputa i tētahi raupapatanga whakaaro arorau, tētahi hāponotanga rānei</li> <li>– ka hanga whakawhānuitanga.</li> </ul> </li> <li>• Ko te whakamahi kīanga pāngarau tika, te whakawhitiwhiti rānei i te aroā pāngarau.</li> </ul>

## Kōrero Āpiti

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

rapanga	Ko ngā āhuatanga o ia rā, ngā āhuatanga pāngarau rānei, ka whai wāhi mai te whakamahinga o te mātauranga pāngarau, o ngā huatau pāngarau, o ngā tikanga pāngarau rānei.
ētahi tikanga whānui	Kia toru, nui ake rānei ngā tikanga.

2 Ka whai wāhi atu ki te *ine*, ko te whakamahi waeine ngahuru mō te roa, te horahanga, te rōrahi, te kītanga, te papatipu, te paemahana me te wā, me ngā waeine pāpātanga pērā i ērā mō te kiato, te tere, te utu ā-waeine me te whakapau kōhinu.

- 3 Kia taunga te ākonga ki ngā tikanga e whai wāhi mai ana:
- te paenga
  - te horahanga me te horahanga mata
  - te rōrahi
  - ngā waeine ngahuru.

Kuputaka:

whakaaro tūhonohono relational thinking

whakaaro waitara abstract thinking

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### He Kōrero mō te Whakakapi

Koinei hei whakakapi i te paerewa 5241, me te paerewa paetae 90149.

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### 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 0233