

Achievement Standard

Subject Reference	Mathematics and Statistics 3.11		
Title	Conduct an experiment to investigate a situation using experimental design principles		
Level	3	Credits	4
		Assessment	Internal
Subfield	Statistics and Probability		
Domain	Statistics		
Status	Registered	Status date	4 December 2012
Planned review date	31 December 2016	Date version published	4 December 2012

This achievement standard involves conducting an experiment to investigate a situation using experimental design principles.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Conduct an experiment to investigate a situation using experimental design principles. 	<ul style="list-style-type: none"> Conduct an experiment to investigate a situation using experimental design principles, with justification. 	<ul style="list-style-type: none"> Conduct an experiment to investigate a situation using experimental design principles, with statistical insight.

Explanatory Notes

- This achievement standard is derived from Level 8 of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007; and is related to the achievement objectives:
 - Carry out investigations of phenomena, using the statistical enquiry cycle:
 - conducting experiments using experimental design principles
 - seeking explanations
 - using informed contextual knowledge, exploratory data analysis, and statistical inference
 - communicating findings and evaluating all stages of the cycle
 - Make inferences from surveys and experiments:
 - using methods such as randomisation to assess the strength of the evidence in the Statistics strand of the Mathematics and Statistics Learning Area. It is also related to the material in the *Teaching and Learning Guide for Mathematics and Statistics*, Ministry of Education, 2012, at <http://seniorsecondary.tki.org.nz>.

- 2 *Conduct an experiment to investigate a situation using experimental design principles* involves showing evidence of using each component of the investigation process.

Conduct an experiment to investigate a situation using experimental design principles, with justification involves linking components of the process of investigating a situation by experiment to the context, explaining relevant considerations in the investigation process, and supporting findings with statements which refer to evidence gained from the experiment.

Conduct an experiment to investigate a situation using experimental design principles, with statistical insight involves integrating statistical and contextual knowledge throughout the investigation process, and may include reflecting about the process; discussing how possible sources of variation were dealt with during the design phase; considering other relevant variables.

- 3 The process of investigating a situation by experiment using experimental design principles involves:

- posing an investigative question about a given experimental situation
- planning the experiment using experimental design principles
 - selecting experimental units
 - determining treatment and response variables
 - determining allocation of treatments to experimental units
 - determining data collection and recording methods
 - considering other sources of variation
- conducting the experiment
 - collecting data
 - recording any issues that arise
- selecting and using appropriate displays and summary statistics
- making an appropriate formal statistical inference
- communicating findings in a conclusion.

- 4 Conditions of Assessment related to this achievement standard can be found at www.tki.org.nz/e/community/ncea/conditions-assessment.php.
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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