

NZQA Approved

Internal Assessment Resource

Mathematics and Statistics Level 2

This resource supports assessment against Achievement Standard 91265 version 2

Standard title: Conduct an experiment to investigate a situation using statistical methods

**Credits:** 3

Resource title: Jump line

**Resource reference:** Mathematics and Statistics 2.10C

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| This resource:   * Clarifies the requirements of the standard * Supports good assessment practice * Should be subjected to the school’s usual assessment quality assurance process * Should be modified to make the context relevant to students in their school environment and ensure that submitted evidence is authentic |

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| Date version published by Ministry of Education | February 2015  To support internal assessment from 2015 |
| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-91265-01-9025 |
| Authenticity of evidence | Teachers must manage authenticity for any assessment from a public source, because students may have access to the assessment schedule or student exemplar material.  Using this assessment resource without modification may mean that students’ work is not authentic. The teacher may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

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Teacher guidelines

The following guidelines are supplied to enable teachers to carry out valid and consistent assessment using this internal assessment resource.

Teachers/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing students against it.

Context/setting

This activity requires students to conduct an experiment to investigate the effect of using a target as motivation when jumping, using statistical methods with statistical insight.

Conditions

This assessment activity should be conducted in several sessions, over an extended period of time, for example, several weeks.

Students will present their work and findings independently (for part 3), but they can work in small groups of two or three for parts 1 and 2. The instructions may need to be adjusted if students work independently for all parts of the activity.

Confirm the time frame with your students, including the time between the first and successive parts of the activity to allow them to adjust their plans based on your feedback.

Students cannot achieve this standard without actively contributing to the planning and data collection. The teacher may determine this by direct observation or by questioning students about the process.

Students may use appropriate technology (for example, statistical software or spreadsheets). Specify the format of the report and presentation (for example, a computer slide show, written report or oral presentation).

Relevant contextual knowledge is essential. Give students time to research the context before beginning the investigation.

Resource requirements

Provide students with access to background information (for example the library or internet) and resources appropriate to their confirmed experimental plan (for example rulers or other measuring devices).

Additional information

Teachers need to ensure students are familiar with any context specific vocabulary used in this resource.

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Student instructions

Introduction

This assessment activity requires you to conduct an experiment to investigate a situation, about motivation to do an activity, using statistical methods.

You are going to be assessed on how you conduct an experiment for this investigation using statistical methods, with statistical insight. You will integrate statistical and contextual knowledge throughout the investigation process.

The following instructions provide you with a way to structure your work to demonstrate what you have learnt and achieve success in this standard.

Teacher note: It is expected that the teacher will read the student instructions and modify them if necessary to suit their students.

Task

The standing long jump and standing high jump were Olympic events until 1912. Unlike the long jump and high jump events currently held, the standing long jump and standing high jump involved the jump starting from a standing still position.

In this activity you will investigate whether people jump further if they have a target line or point to aim for. You will pose an investigative question, plan an experiment, gather and analyse data and draw conclusions. Your final product will be the presentation of a report, describing your experimental design process, data gathering, analysis and conclusions.

Part 1: Select an experimental situation

In a group select an experimental situation to investigate, based on the effects of using a target to aim for when jumping. Identify the variables you think are important and write a question to investigate.

Part 2: Plan and conduct the experiment

Write a plan for the experiment. The plan should:

* describe the variables and measures you have chosen and why you have chosen them
* explain how you will collect your data and record your results
* link to relevant knowledge about the situation
* describe any related variables and their possible effects
* describe the experimental method.

Submit the plan to your teacher for feedback and adjust as necessary.

As a group, conduct the experiment according to the plan. Record the data and make notes about your observations of the data collection and experimental process. (These notes will be useful for your discussion and reflection on the process when you write your report.)

Part 3: Prepare a report

Working on your own, complete the investigation and prepare a report.

Your report should contain the following:

* Introduction - the investigative question and purpose of the investigation.
* Method – the plan and process used to collect the data.
* Analysis – selection and discussion of appropriate displays and measures.
* Discussion – discussion of findings and any reflections on the process.
* Appendix – evidence of how you conducted the experiment (for example the original plan and any modifications, raw data from your experiment, and any notes from Part 2).

The quality of your report, including discussion and reasoning about the experimental process and your findings, and how well you link this to the context will determine your overall grade.

Assessment schedule: Mathematics and Statistics 91265 - Jump line

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The student conducts an experiment to investigate a situation using statistical methods by:   * posing an investigative question about the experimental situation * planning the experiment by determining appropriate variables and measures and determining data collection and recording methods * conducting the experiment and recording data * selecting appropriate displays and measures * discussing the displays and measures * communicating findings in a conclusion   For example:  The student clearly states their conclusion to the question in context.  The examples above are indicative of the evidence that is required. | The student conducts an experiment to investigate a situation using statistical methods, with justification, 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 by:   * posing an investigative question about the experimental situation * planning the experiment by determining appropriate variables and measures and determining data collection and recording methods   For example:  The student considers related variables and the possible effects of these.   * conducting the experiment and recording data * selecting appropriate displays and measures * discussing the displays and measures using supporting evidence linked to the context   For example:  The student clearly analyses the increase in jump distances.   * communicating findings in a conclusion and linking findings to the experimental situation   For example:  The student clearly states their conclusion to their question in context and produces statistical evidence to support their claim.  The examples above are indicative of the evidence that is required. | The student conducts an experiment to investigate a situation using statistical methods with statistical insight by integrating statistical and contextual knowledge throughout the investigation process which may involve reflecting on the process, or considering other relevant variables by:   * posing an investigative question about the experimental situation * planning the experiment by determining appropriate variables and measures and determining data collection and recording methods   For example:  The student considers related variables and possible effects of these, and develops the plan to mitigate against these if possible.   * conducting the experiment and recording data * selecting appropriate displays and measures * discussing the displays and measures integrating statistical and contextual knowledge   For example:  The student clearly comments on and analyses any differences in jump distances.   * communicating findings in a conclusion and linking findings to the experimental situation. The student reflects on key aspects of the experimental process (e.g. by considering possible sources of variability in the data, effects of related variables and other areas to investigate)   For example:  The student clearly states their conclusion in context and provides statistically produced evidence to support their findings. The student also comments on any unusual values and what other factors could have affected jump distances for the experiment, and may give a possible extension to the experiment based upon their findings.  The examples above are indicative of the evidence that is required. |

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.