



Physical Education Numeracy Enhanced Plan

This resource is aligned to the New Zealand Curriculum (2007) and provides support for the teaching and learning of literacy and numeracy in preparation for the NCEA Co-requisite. It aims to support those students who are using the NCEA qualification pathway.

Setting up a mini inquiry into skill development

Context

These activities describe ākonga **setting up a mini inquiry into skill development** as part of an exploration of skill improvement.

Achievement objectives

Level 5 Health and Physical Education
Movement skills

Ākonga will:

- » acquire and apply complex motor skills by using basic principles of motor learning.

Numeracy connections

Measurement

- » Plan how to use measurement to track progress in movement skills including:
 - choosing measurement tools
 - selecting appropriate units
 - checking accuracy and consistency of measurements
 - determining the degree of precision needed for measurements to track progress.

Resources:

- » [Measurement Information | NZ Maths](#)
- » [Ako engineering resource: using a measuring tape \(pdf\)](#)
- » Measuring equipment (determined by ākonga inquiries), for example, trundle wheel, tape measures, stop watches.

Prior Learning

Before being introduced to this learning activity, ākonga will have explored:

- » principles for learning basic motor skills, for example, types of practice
- » basic biomechanics, for example, stability, generating force, angle of release
- » the process of inquiry.

Establishing a focus of inquiry

Introduction: Ākonga will be working on a mini inquiry in groups of up to four to develop a Performance Improvement Plan focused on improving a movement skill.

Examples of movement skills include:

- » *locomotor skills such as running or jumping, eg how far or high they can jump*
- » *stability skills such as balance or rotation, eg how long they can spin a basketball on a fingertip or maintain a particular balance*
- » *manipulative skills such as throwing or kicking, eg how accurately or far they can kick a ball.*

*As part of their inquiries, ākonga will need to **use measurement to track their progress.***

Sequence of learning

Provide large sheets of paper and have ākonga work in groups of up to four to **brainstorm movement skills** that they could focus on in their inquiries. For each movement skill, have ākonga **identify what they would measure** and **what unit they would use**.

For example, ākonga might suggest how long they can keep a hula hoop rotating around their waist as one option of a movement skill. The unit would be minutes and seconds (or potentially just seconds).

Circulate around each group and ask them to **describe how they will measure the skill or area of fitness they are planning to investigate**, including what measuring equipment they will need.

Once groups have chosen the movement skill and how they will measure it, provide time for ākonga to start thinking about how they will improve the skill. They might do some research or reading to get initial ideas.

Literacy connection: The [Literacy Pedagogy Guide for Health and PE](#) can be used to support ākonga as they locate, read and interpret information.



Planning the inquiry

The following questions can be given to ākonga to **scaffold the development of their inquiry plan**:

- » What skill are you planning to improve?
- » What actions will you take to improve that skill?
- » How will you measure change?
 - What units will you use?
 - What equipment will you need?
 - How many measurements will you take?
 - How accurate do your measurements need to be in order to track progress?
 - How will you know your measurements are accurate?
 - How will you present your data? For example, will you use a table or a graph?

Activity note: *Ākonga might decide that they want to improve the length of a football kick. As part of planning their inquiry they could:*

- » *identify actions they might make such as practising kicks, videoing their performance and using what they see in it to adjust their technique*
- » *decide to measure progress by comparing the longest distance kicked (out of five kicks) before training and the longest distance kicked (out of five kicks) after going through a skill development process*
- » *decide that the measurements will be to the nearest centimetre*
- » *identify what they will need, ie a football, tape measure, and cones for marking.*

Encourage ākonga to be as specific as possible in their plan about **how they will be measuring their movement**, including specifying the equipment they need and detailing how they will measure.

Activity notes: *If ākonga want to improve their long jump, they might use a tape measure with metres and centimetres. To ensure consistency, each jump is measured from the back of the jump board to where there is a mark in the sand, and they will make sure that the measuring tape is tight and straight rather than angled.*

Where time is being measured, ākonga might consider having two people time the event, and compare results to ensure that errors in timing are minimised.

Activity 2: Sequence of learning (continued)



Each group **share their plan** with another group. Each group **provides each other feedback** that helps to refine the inquiry plan. You can provide ākonga with focus statements for feedback, such as:

- » One thing I think is interesting about your inquiry is...
- » One suggestion I have is...
- » One question I have is...

Discuss as a class options for deciding which measurement to use when more than one measurement has been made, for example, recording the best result from three attempts, or using an average such as the median or mean. This can provide an opportunity to discuss the difference between the mean and the median. This [supporting document](#) includes guidance on the pros and cons of each. (Note that the mode, which is the value that occurs most often, is not a suitable average in this context.)

Ākonga **improve their inquiry plans** based on feedback from their peers and the class discussion.

Numeracy connection: *In this activity, ākonga are planning an investigation and determining the maths skills and knowledge they will need to use.*



Using measurement to gather baseline data

Introduction: *The focus in this activity is to test out the measurements ākonga will use in their inquiry and to gather baseline data they can use to track progress.*

Provide ākonga with the measuring equipment they need, for example, a trundle wheel, tape measure, or a stopwatch.

As ākonga gather data to find their baseline in the event, **circulate the class**, and have ākonga:

- » demonstrate how they are taking measurements
- » decide if they need to adjust how they are taking the measurements, and if so, why
- » show you the techniques they are using if the measurement exceeds the limits of the measurement tool they are using (if relevant), for example, a throw that is longer than the tape measure they are using
- » explain the accuracy of measurement they will need for their inquiry, for example, to the nearest centimetre (cm) or 100 milliseconds (ms).

The table below suggests some aspects of measurement to check as you work with ākonga.

Equipment	Things to check
Trundle wheel	» Check the distance the wheel travels in one rotation. » Check that there is no debris in the trundle wheel as this can affect the measurement. » Walk at a steady, consistent pace as changing pace can affect the rotation. » Pick up the trundle wheel after completing the measurement to avoid further rotation.
Tape measure	» Begin each measurement from zero. Be aware that some tape measures have a hook that obscures the zero measurement. » Understand the units of measurement. » Accurately read the measurement scale on the tool.
Stopwatch (this could be using the stopwatch on their phone) 	» Know how to start, stop, and clear the stopwatch. » Understand that a stopwatch records time in hours, minutes, seconds, and milliseconds (but that typically only two digits of the milliseconds are displayed, not all three), and decide on the level of precision needed. For example, the time measured on this stopwatch is 2 minutes, 41 seconds, and 500 milliseconds or 2 minutes and 41.5 seconds. Check that ākonga know that they can't write this as 2.415 minutes because 41 seconds is not 0.41 of a minute. If necessary, provide an example using 30 seconds, which is half of a minute (0.5) not 0.3 minutes.

Activity 3: Sequence of learning (continued)

Numeracy connection: *Providing ākonga with a tape measure with both inches and centimetres provides an opportunity to check their understanding of metric units and selecting an appropriate scale.*

Ākonga record their results and make any adjustments to their original plan, to ensure that the same method of measuring is used to track their post-training improvements.

Next steps in Numeracy learning

To build on this learning, ākonga could:

- » use their measurements to calculate and compare averages pre- and post-training
- » use measurements to tell a story, eg “I’ve noticed that our throws are often shorter in the afternoon, this could be because we’re feeling tired after lunch.”
- » reflect on ways to improve the accuracy or reliability of their measurements
- » create data displays to present their pre- and post-training skills or level of fitness, for example, a table or graph
- » use their findings to draw a conclusion and consider next steps or reflect on what they could have done differently.

See the [Numeracy Pedagogy Guide for Health and Physical Education](#) for additional ideas on how to integrate Numeracy learning into your teaching practice.