

Supporting NCEA Numeracy in Health and Physical Education



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.

Health and Physical Education has rich opportunities for ākonga to extend and enrich their numeracy capabilities as they build their understanding of hauora and movement.

In Health and Physical Education (HPE) ākonga develop their numeracy skills when they:

- » calculate, estimate, and measure to make sense of information related to nutrition, fitness, and skill performance
- » use statistical reasoning to interpret and analyse information about health and physical activities
- » identify patterns and relationships in data to consider trends, draw conclusions, make predictions about health behaviours and actions
- » evaluate health and wellbeing claims made by others.

This Numeracy Pedagogy Guide (NPG) takes a selection of mathematical and statistical content ideas from Unpacking Numeracy and illustrates the small, effective steps that you can trial and weave into your teaching practice.



Health and Physical Education Numeracy Pedagogy Guide



Operations with numbers	What can this look like in Health and Physical Education?	What can I do as a kaiako of Health and Physical Education?
Work with whole numbers up to billions, fractions, decimals to 3 places, percentages, and integers.	Use rounding to estimate a percentage. Convert a fraction into a percentage. <i>Ākonga explore the proportion of recommended dietary intake (RDI) of nutrients in different products, making comparisons with recommended dietary intake (RDI).</i>	Show ākonga how they might round numbers to help them estimate a percentage of an amount. <i>A glass (250 mL) of full-fat milk has 5.4 grams of saturated fat. The RDI of saturated fat for adult women is around 20 grams. What is the percentage of the RDI of saturated fats in a glass of full-fat milk?</i> Solution as an estimation If we round 5.4g to 5g,¹ we know that the fraction of saturated fat in the milk² is about $\frac{5}{20}$. This can be simplified to $\frac{1}{4}$. $\frac{1}{4}$ is the same as 25%³. So full fat milk gives an adult woman approximately 25% of her RDI of saturated fats. Solution as a calculation The calculation for this is $\frac{5.4}{20} \times 100 = 27\%$ ⁴
Calculate averages (including the mean).	Understand that average refers to the calculation of mean, median and mode. Calculate mean, median and mode for a dataset. Select the appropriate average to use. <i>Ākonga calculate the mean, median, and mode of a set of anonymously collected pulse rates and discuss which average best represents a 'typical' value for the set.</i>	Acknowledge that when "average" is used, this often refers to the mean; however, average is defined as the mean, median and mode. Encourage ākonga to calculate all three averages and select the average they think is most appropriate to their situation. Ask them to justify their thinking.

Location and navigation	What can this look like in Health and Physical Education?	What can I do as a kaiako of Health and Physical Education?
Describe position and orientation in situations that are flexible in the system being used.	Use compass directions NSEW (and NE, NW etc) to navigate. <i>Ākonga work in groups to create an orienteering course using agreed approaches to describing position and orientation, for example, compass directions, degrees, or quarter turns left or right.</i>	Discuss the limitations of using only NSEW and secondary cardinal directions (such as NE, SW etc) when navigating. Discuss the degree of accuracy needed to describe orientation. If using paces as an estimate of distance, discuss what an 'average' pace length might be.

Measurement	What can this look like in Health and Physical Education?	What can I do as a kaiako of Health and Physical Education?
Use and interpret results of measurement (including timetables and time charts).	Estimate and take measurements. <i>Ākonga use measuring equipment to set up a game of Ki o Rahi or Tapu Ae, for example, determining then checking the distance between pou or the diameter of circles.</i> <i>Ākonga estimate how long it will take them to run 1km and compare this estimate to the actual time taken to run this distance. Ākonga can then use time taken to run 1km to estimate how long it would take them to run 5km and provide justifications for this new estimate.</i> <i>Ākonga measure the distance of a jump from a starting line to the back of the foot.</i>	Provide regular opportunities for ākonga to practise their estimation skills. Provide a range of measuring equipment to select from and ask ākonga to justify their choice of equipment. Discuss ways that known measurements can be used to estimate unknown measurements. Identify ways measurement techniques have been standardised and discuss why this is important in a sporting context.
Select appropriate units and convert between metric measures for the same attribute.	Use appropriate measures and units in measurement. <i>Ākonga convert times between metres per second (for a 100 m sprint) and kilometres per hour (for a marathon).</i>	Discuss with ākonga which units would be appropriate for a particular context. Encourage them to justify their choices.

Statistics and data	What can this look like in Health and Physical Education?	What can I do as a kaiako of Health and Physical Education?
Recognise and use appropriate data displays to investigate questions or claims for summary, comparison, and simple time series situations.	Create questionnaires that are appropriate to research needs.	Discuss with ākonga the different types of questions they could use in their questionnaire. <i>Extension:</i> Ākonga justify why they have posed a specific question in a certain way.
Interpret data displays using features such as clustering, centrality, spread, unusual pieces of data, frequencies, and patterns.	Identify and interpret the features of visual displays. <i>Ākonga explore data related to smoking on the ‘facts and figures’ page of the Smokefree website.</i>	Give ākonga a statistical question they can use in pairs or small groups to discuss and interpret their data displays, for example: » What do you notice? » What patterns can you see? » What does it make you wonder? » What conclusions can you draw from this display? » What gaps might there be in the information it provides?
Evaluate statements and representations made by others, based on data that is provided to them.	Investigate claims in health articles and critically evaluate the reliability of the article. <i>Ākonga use the Kupe data explorer provided by Te Hīringa Hauora Health Promotion Agency to investigate claims about New Zealanders’ views and experiences across several topics of behaviours and attitudes.</i> <i>Ākonga evaluate statements made in the 2021 Asthma Respiratory Foundation NZ report into youth vaping. Ākonga can match statements about youth vaping with the data displays on pages 6 to 10 of the report.</i>	Provide questions that support ākonga to evaluate the credibility and reliability of statistical data, for example: » What was the purpose of the study? » Who collected it? » What information was gathered? » When was the information collected? » How was the information gathered? » Is the information consistent with other sources?

Footnotes

- To round to a whole number, ākonga must:
Look at the digit (singular number) after the decimal point.
If this digit is between 5 and 9, then the whole number increases by 1.
If this digit is between 0 and 4, then the whole number stays the same.
- To simplify a fraction, ākonga must:
Find a value that can divide the top number (numerator) AND the bottom number (denominator)
In this example, 5 can go into both 5 AND 20.
 $5 \div 5 = 1$
 $20 \div 5 = 4$
- Ākonga can use [benchmark values](#) to help understand that $\frac{1}{4} = 25\%$
- 5.4g is the amount of saturated fat. It is the amount you are interested in.
20g is the total amount of fat.
 $\frac{5.4}{20}$ is the fraction of the milk that has saturated fat.
The line between 5.4 and 20 means to divide.
 $5.4 \div 20$ is then multiplied by 100 to change it into a percentage.