MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

Supporting NCEA Numeracy in Social Studies

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.

As a kaiako of the Social Sciences, your ākonga will naturally use mathematical and statistical content ideas to interpret and evaluate the individual behaviours and societal interactions found in your learning area.

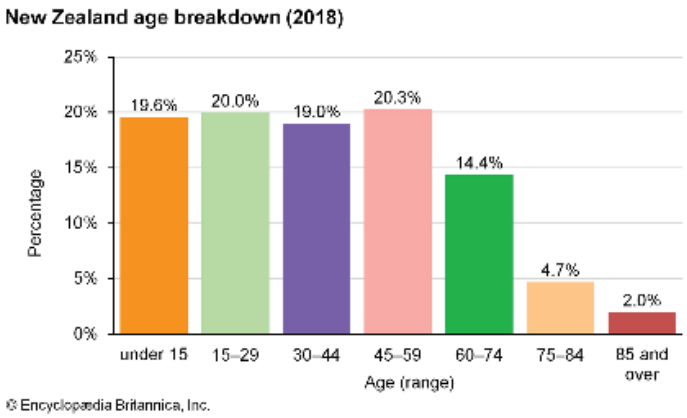
By explicitly teaching ākonga the content ideas in numeracy, you can deepen their understanding of society and the environment, and provide relevant context for ākonga to base their mathematical and statistical ideas on. When ākonga can connect numeracy to a real-world context, they are better able to identify practical uses for their mathematical and statistical skills beyond the world of education.

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.

Social Studies Numeracy Pedagogy Guide

Operations with numbers	What can this look like in Social Studies?	What can I do as a kaiako of Social Studies?
Work with whole numbers up to billions, fractions, decimals to 3 places, percentages, and integers	Say the value of large numbers with correct place value. Calculate percentages of amounts. *Ākonga might calculate the number of seats each political party will get based on the percentage of votes they have received.* *Ākonga calculate percentage per capita of lives lost in war and evaluate how this affects different populations.* *Ākonga calculate percentages of survey respondents who are using different sales options (ie online, store etc).*	Use the place value house to help ākonga say numbers that are in the millions or billions. There are many methods to calculate a percentage of an amount. *The New Zealand Parliament has 50 seats for party votes. If one party wins 30% of the vote, how many seats will it get?* The calculation is interpreted as 30% of 50, where "of" means to multiply. 1. 30 ÷ 100 × 50 = 15 seats[1] 2. 30/100 × 50 = 3/10 × 50 = 3 × 50/ 10 = 3 × 5 = 15 seats[2] 3. 10% of 50 = 10/100 × 50 = 1/10 × 50 = 50 ÷ 10 = 5 5 × 3 = 15 seats[3]
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. *Ākonga may read about median house prices in Auckland increasing from one quarter when looking at urban sprawl.*	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.

Geometry and measurement	What can this look like in Social Studies?	What can this look like in Social Studies?
Have a way to navigate between points	Use compass directions NSEW (and NE, NW etc) to navigate.	Te Kapehu Whetū or the Māori Compass can be used to help ākonga Māori to develop a more personal connection with mathematics.
Select appropriate units and convert between metric measures for the same attribute.	Identify methods of measurement diverse cultures have used in the past. *When constructing a wharenui, the arm span (aronui) of a designated person, most often someone of importance, would be marked on a cord or rod (rauru) for measuring purposes. The name of a person would be recorded in the specific history of the whare.* Source: Science Learn	Discussing methods of measurement from diverse cultures with ākonga can develop their personal connection with mathematics.

Statistics and data	What can this look like in Social Studies?	What can I do as a kaiako of Social Studies?
Recognise and use appropriate data displays to investigate questions or claims for summary, comparison, and simple time series situations	Create surveys that are appropriate to research needs. Identify whether data is categorical, discrete, or continuous.[4] Draw an appropriate graph for the data provided. *Ākonga survey their class to find out where people are from as part of a migration topic.* *Ākonga survey other ākonga to gather information on price, product and promotion to help groups make decisions for Market Day.*	Discuss with ākonga the different types of questions they could use in their survey. *Extension:* Ākonga justify why they have posed a specific question in a certain way. Discuss with ākonga factors that determine which data displays are most useful for a set of data: » Pictographs, bar graphs, strip graphs and pie charts can display categorical or discrete data » Dot plots and stem-and-leaf graphs can display discrete or continuous data. It helps order values so that averages can be calculated. » Scatterplots are used to show relationships between two variables » Time series graphs show change over time. For more information about each type of graph click here.
Interpret data displays using features such as clustering, centrality, spread, unusual pieces of data, frequencies, and patterns	Identify key features of graphs. Discuss what these features mean in context and why this might be happening.  *What I notice: The age group with the least amount of people are those who are 85 years old and over.* *Evidence: Only 2% of NZers are 85 and over. It is the shortest bar on the graph.* *Relate to context: Our life expectancy is 81 years old, so it makes sense there are less people over the age of 85.*	Use sentence stems to help ākonga: » state what they notice on the graphs » specify their evidence » relate this back to their context For pictographs, bar graph, strip graph, pie charts, dot plots and stem-and-leaf graphs common observations may be: » The most popular result » The least popular result For dot plots and stem-and-leaf graphs and scatter plots common observations may be: » Clusters of values » Any unusual values, like a value that does not fit a pattern or is extremely low or extremely high For time series graphs, common observations may be: » Long term trends (increasing or decreasing over time) » Seasonal trends (if there are spikes or dips at certain times every cycle) » Any unusual spikes or dips

Evaluate statements and representations made by others, based on data that is provided to them	Discuss how people and/or societies can manipulate data for their own purposes. Question the validity of data sources. *Ākonga discuss how the redefinition of unemployment made it appear like unemployment was decreasing in Nazi Germany.* *Ākonga evaluate their own misconceptions that are formed from the data that they absorb in their day-to-day life.*	Encourage ākonga to identify times in history where data manipulation was used and how this affected society. Ākonga investigate the source of their data and evaluate if there is bias. Investigate how misinformation is spread and how data manipulation contributes to misinformation. Challenge the misconceptions that ākonga may have using Gapminder's tool that is linked to the UN goals.

Footnotes

[1] This method requires ākonga to understand that:

A percentage is a value out of 100. This means 30% = $\frac{30}{100}$

The line between the numerator and denominator means "to divide".

[2] This method requires ākonga to understand that

A percentage is out of 100.

$\frac{30}{100}$ can be simplified to $\frac{3}{10}$ by dividing the numerator (top number) and denominator (bottom number) by the same value.

When multiplying fractions, the order we multiply the values does not change the solution (called the commutative law). This means $\frac{3}{10} \times 120$ (or $\frac{3}{10} \times \frac{120}{1}$) = $3 \times \frac{120}{10}$ (or $\frac{3}{1} \times \frac{120}{10}$).

The line between the numerator and the denominator means to divide. This means $\frac{50}{10}$ = 50 ÷ 10 = 5

[3] This method requires ākonga to understand the same concepts as above.

[4] Categorical data is where the data is a worded, non-numerical response. eg. What colour is your hair?

Discrete data is a numerical response that is a whole number. This means it cannot be a decimal. eg. How many cats do you have?

Continuous data is a numerical response that is often a measurement. The number can be a decimal. eg. How tall are you?