



Supporting NCEA Numeracy in the Economic World

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.

The Social Sciences can extend and enrich the numeracy capabilities of ākonga as they build their understanding of “how societies work and how people can participate as critical, active, informed and responsible citizens¹.”

Within the Economic World, which can be offered as part of the Social Sciences, ākonga can use their numeracy capabilities to explore how economic decisions impact individuals and communities and develop their understanding of ethical consumption and investment.

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.

The examples in this NPG are intended to be part of a broader exploration of the social issues they relate to.



¹ Ref: [The New Zealand Curriculum](#)

The Economic World Numeracy Pedagogy Guide



Operations with numbers	What can this look like in the Economic World?	What can I do as a kaiako of the Economic World?
Work with whole numbers up to billions, fractions, decimals to 3 places, percentages, and integers.	Recognise when a number has been rounded, and why this is important. <i>Ākonga may read reports about local and central government income and spending. For example:</i> » Budget 2020 » Spending of different government departments.	Discuss the reason for rounding, for example, that it simplifies communication. Model how to round numbers using number lines. This NZMaths resource may be useful.
	Compare values that are in the millions or billions <i>Ākonga compare the total value of money spent on Treaty settlements with other forms of government spending.</i>	Use the place value house to help ākonga compare large numbers that are in the millions or billions.
	Calculate percentage increases. <i>Ākonga investigate the 'pink tax', and calculate how much a 'pink' item would cost.</i>	There are many ways to calculate a percentage increase: <i>A 20-pack of blue disposable razors costs \$9. In the article, it says that a "pink tax" increases this price by 7%. How much would a 20-pack of pink disposable razors cost?</i> 7% of \$9 = $0.07 \times 9 = \\$0.63$ extra¹ $9 + 0.63 = \\$9.63$ to pay in total $1.07 \times 9 = \\$9.63$ to pay in total²
	Calculate the percentage change when given the original price of an item and its new price after a percentage increase. <i>Ākonga investigate the inflated prices of goods sold in Mobile truck shops - Consumer NZ. They compare prices of items listed on the web-sites of companies mentioned in the article with similar items available in stores.</i>	To calculate a percentage change³: $\frac{(\text{Amount after percentage increase} - \text{amount before percentage increase})}{(\text{Amount before percentage increase})} \times 100$

Work with whole numbers up to billions, fractions, decimals to 3 places, percentages, and integers.	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 investigate why Statistics New Zealand uses median hourly pay to calculate the pay gaps rather than mean and/or weekly or annual pay. (See Measuring the gender pay gap, pages 3-6, for an explanation.)</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.
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Statistics and data	What can this look like in the Economic World?	What can I do as a kaiako of the Economic World?
Recognise and use appropriate data displays to investigate questions or claims for summary, comparison, and simple time series situations.	<i>Create questionnaires that are appropriate to research needs</i> <i>Ākonga conduct a survey on ethical consumer decision making and then present the information they gather in a graph to make and support a claim. (See Activity One in Module 2 - Consumer power for ways to extend and build on this activity, for example, by comparing the data gathered to national or international studies of ethical consumer decision making.)</i> Use data displays to investigate statistical claims <i>Ākonga explore claims related to the gender healthcare pay gap and how it has changed over time.</i> <i>Ākonga choose a category to investigate from What's my Gender Pay Gap? Ministry for Women and develop comparison statements based on the information they find to share with the class.</i>	Discuss with ākonga the different types of questions they could use in their questionnaire. Extension: Ākonga justify why they have posed a specific question in a certain way. Use statistical terms such as variable, numerical variable, category or categorical variable, bar graph or bar chart, histogram, time series data, and scatter plot. 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 display categorical and discrete data. » Dot plots and stem-and-leaf graphs display discrete and continuous data. It helps order values so that averages can be calculated. ⁴ » 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.	Interpret features in representations of data. <i>Ākonga use a data display to investigate the unemployment rate in Aotearoa New Zealand.</i> Other resources you may wish to access include: » Aotearoa New Zealand's survey results in the OECD Better Life index » Per capita carbon emissions (international comparisons – see Figure 9 on this Ministry for the Environment website » Aotearoa New Zealand greenhouse gas carbon emissions.	<i>Give ākonga a statistical question they can use in pairs or small groups to discuss and interpret selected data displays, for example:</i> » 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? <i>When looking at the data display of unemployment rates in Aotearoa New Zealand, ākonga might:</i> » notice that there was a big spike in unemployment in 2020, likely due to the Covid19 pandemic » recognise that the unemployment rate in January 2022 is at its lowest since 2019 and ask questions about how long it has been since it was this low » question if part-time employment is included. <i>Encourage ākonga to strengthen their statements by referring to specific information in the display.</i>
Evaluate statements and representations made by others, based on data that is provided to them.	Evaluate whether media statements are accurate, based on the information displayed in a report. <i>Ākonga evaluate the significance of Foodstuffs' 10% wage increases, balancing this with the high proportion of supermarket workers who are on minimum wage.</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

¹ This is the amount the original value is increased by. Ākonga translate “of” as $\times$ and convert 7% into a decimal by calculating $7 \div 100$.

² For a percentage increase in one step, ākonga must:

- › Change the percentage into a decimal by calculating $7 \div 100 = 0.07$
- › $100\% = 1$ whole is the entire amount. An increase of 7% or 0.07 is therefore 107% or 1.07 of \$9, the original amount.
- › Interpret “of” as $\times$

³ The numerator (top number in the fraction) calculates the difference between the two prices.

The denominator (bottom number in the fraction) compares the difference to the actual price.

The line between the numerator and denominator means these two numbers need to be divided.

The multiplication by 100 transforms the decimal into a percentage (as per cent means out of 100)

⁴ Categorical data is where the data is a worded, non-numerical response. eg. What colour are your eyes?

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?