MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

Supporting NCEA Numeracy for Learning Languages

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.

Learning Languages provides ākonga opportunities to discover new cultures and to view their own world through a different lens.

The numeracy opportunities in Learning Languages are limitless, with different cultures providing numeracy-rich, meaningful contexts for ākonga to explore. They can range from the mundane of interpreting a train timetable in a new language to the exploration of different forms of navigation other cultures use.

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.

Learning Languages Numeracy Pedagogy Guide

Operations with numbers	What can this look like in Learning Languages?	What can I do as a kaiako of Learning Languages?
Recognise the (degree of) precision required for the context	Identify an approximation that can be used to convert between two currencies.	Discuss with ākonga techniques to quickly convert between currencies and the advantages and limitations of such a strategy. *At the currency exchange, $1NZD is currently worth T$1.49 (Samoan Tala). If $20NZD was exchanged for Samoan Tala, a good approximation of how much tala would be received would be to calculate 20 × 1.50 = T$30. By rounding T$1.49 to $1.50, the calculation is simplified.*
Work with whole numbers up to billions, fractions, decimals to 3 places, percentages, and integers.	Use exchange rates to calculate the cost of items between two (or more) countries. *Ākonga compare the cost of purchasing an item from another country to their local currency. They use phrases such as "How much is it?" or "Is it worth it?" in the target language to determine which country provides the best prices for a product (or products).*	Provide opportunities for ākonga to interact with websites in the target language (and in the target language's currency) where they may wish to purchase goods or services. Encourage ākonga to use mathematical ratios to convert the target language's currency into local currency using this resource. Model how the calculation is used in context. Evaluate how slight changes to exchange rates can impact purchasing power.
	Calculate the fraction of an amount when bargaining for goods. *Ākonga role play a situation where they barter in the target language.*	Discuss a guideline ākonga can use in another country that uses the target language to start bargaining. *In countries where bargaining for a good is common, a guideline when bartering is to counter with $\frac{1}{3}$ of the vendor's proposed price. This means if a vendor offers an item for ¥25, ākonga should counter with $\frac{1}{3}$ of 25. This is approximately ¥8, since 25 ÷ 3 is close to 24 ÷ 3 = 8.*[1]
	Work with proportions and ratios when making food in the target language's culture.	Create opportunities for ākonga to use ratios. *In a 3-ingredient recipe that makes 4 servings of Korean strawberry milkshakes 500g of strawberries, 80g of sugar and 1l of milk is needed. If ākonga want to make 10 servings, then they will need 1.25kg of strawberries, 200g of sugar and 2.5l of milk.*[2]

Location and navigation	What can this look like in Learning Languages?	What can I do as a kaiako of Learning Languages?
Have a way to navigate between points	Using directions in the target language to locate a landmark. Use a map to determine the direction of landmarks.	Ask ākonga to role play providing directions to a landmark in the target language. Terms such as north, south, east, west, and straight ahead, left and right might be used. Use scale on maps to have ākonga estimate travel times between locations.
Describe position and orientation in situations that are flexible in the system being used	Explore navigation systems used by another culture.	Provide ākonga with opportunities to investigate alternative navigation systems. *Polynesian navigators used non-instrumental navigation or wayfinding to discover new lands. These forms of navigation included Te Kāpehu Whetū and using the sun and moon and ocean swells.*

Measurement	What can this look like in Learning Languages?	What can I do as a kaiako of Learning Languages?
Use and interpret results of the measurement (including timetables and time charts)	Read transportation timetables (including digital timetables) from another country. *Ākonga locate timetables for a common form of transportation and use this resource to develop an itinerary that visits landmarks around a country or city. Ākonga can state the latest train/bus they can take to ensure they reach a landmark by a specific time.* Calculate time differences between two countries or within a country. Convert between 12-hour and 24-hour time. *Ākonga use time differences to calculate when it would be appropriate to contact a person overseas. A time zone converter may use 12-hour and 24-hour time.*	Provide opportunities for ākonga to use information in timetables in a practical activity. This resource from NZMaths uses a New Zealand context but may provide some useful ideas. Use technology, such as a time zone converter to explore time differences between two locations. Discuss how time zones can impact daily life in a country. *Despite being in five different geographical time zones, all of China follows Beijing time for the purpose of national unity. In contrast, Japan has only one time zone as it extends over a small latitude and longitude on the earth.* Draw the attention of ākonga to the use of 12-hour and 24-hour time. Ask them to explain why both measures are given.[3]

Select appropriate units and convert between metric measures for the same attribute.	Draw a timeline of historical events in the target language. Consider the way in which time and timelines are presented in different cultures.	Support ākonga to use an appropriate scale to draw a timeline. *0.5cm might be used to represent 1 year on a timeline if events occur over a span of 20 years. A scale of 1cm to represent 1 month might be more appropriate for a one year timeframe.*
Solve measurement problems in practical contexts » **temperature**	Explore weather patterns in another country, including temperature changes. *Ākonga use meteorological data to identify to determine the best time to visit another country.*	Ensure that ākonga are accessing temperatures in °C, or have the tools to convert temperatures into °C (incl. digital tools).[4] Invite ākonga to explain how they read basic meteorological data and evaluate temperatures in relation to other factors, including humidity and rainfall. Encourage ākonga to describe temperatures using positive and negative numbers (called integers).

Statistics and data	What can this look like in Learning Languages?	What can I do as a kaiako of Learning Languages?
Recognise and use appropriate data displays to investigate questions or claims for summary, comparison, and simple time series situations	Write a questionnaire in the target language. *Ākonga survey their class about their daily routine.*	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
Evaluate statements and representations made by others, based on data that is provided to them	Use statistics and data to discuss similarities and differences between two (or more) countries.	Use Gapminder's Dollar Street to explore the ways in which people in other countries live.

Footnotes

[1] To do this calculation, ākonga need to know:

$\frac{1}{3}$ of 25 means $\frac{1}{3} \times 25$ or $\frac{1}{3} \times \frac{25}{1}$. All numbers have a denominator (bottom number of a fraction). If a number has no denominator, this means that the denominator is 1.

$\frac{1}{3} \times \frac{25}{1} = \frac{25}{3}$. When multiplying fractions, multiply the numerators and multiply the denominators.

The line between the numerator and the denominator means to divide. This means $\frac{25}{3} = 25 \div 3 = 8.33$.

[2] To do this calculation, ākonga need to know:

What value does 4 need to be multiplied by to get 10? This is the mathematical calculation $4 \times ? = 10$. Division is the opposite of multiplying. This means $? = \frac{10}{4}$ or $\frac{5}{2}$.

$\frac{5}{2}$ can mean 5÷2 or 2.5 as the line between the numerator (top number) and denominator (bottom number) means divide.

Each portion of the ratio must be multiplied by 2.5 to obtain the correct ratio if 10 servings are made.

[3] The 24-hour clock is favoured as it labels time unambiguously, whereas time using the 12-hour clock can be misinterpreted.

[4] To convert from Fahrenheit (°F) to Celsius (°C), use the formula $C = \frac{5}{9} (F - 32)$.

For example, if a location is 59°F the temperature in °C, would be $C = 5 \div 9 (59 - 32) = 15°C$.