

EXPLORING MĀORI MEASUREMENT SYSTEMS

Core idea: Explore how early Māori in Aotearoa used their bodies as highly effective and practical measurement systems for building, crafting and navigation.

Essential materials: Students' bodies, string or paper strips and classroom objects to measure.

INTRODUCTION: MEASUREMENT WITHOUT RULERS

Imagine building a detailed carved canoe or a huge wharenuī (meeting house) with no ruler, no tape measure—just your own body. How do you think early Māori managed this?

Guide towards: They developed clever, effective ways to measure the world around them using their bodies. These systems were practical, flexible and remarkably accurate.

What kinds of things would they have needed to measure?

Prompt for: Lengths for buildings (wharenuī), distances for travel, materials for weaving, patterns for tā moko (traditional tattooing).

- **Hau:** Half of a mārō. The distance from the middle of the chest to fingertips when arm is stretched to the side.
- **Paē:** Similar to the mārō span, but with arms curved, used for measuring around things like trees.
- **Takoto:** The length of the body lying flat on the ground, plus the length of one arm stretched out past the head.

(B) Activity: Body measurements

- "How many **kōnui** long is your pencil?"
- "How many **koiti** wide is your book?"
- "How many **ringa** wide is your desk?"
- "How many **matikara** long is the whiteboard?"
- "How many **tuke** high is the door handle?"
- "Measure the width of the classroom with your **mārō**!"

PART 1: BODY POWER – USING BODIES TO MEASURE

(A) Identifying body measurement units

The main way Māori measured things was using parts of their body. Introduce and demonstrate the following units:

- **Kōnui:** The length of the first joint of the thumb.
- **Koiti:** Little finger length.
- **Ringa:** Hand width
- **Matikara:** The span from the thumb tip to the little finger tip when the hand is spread out.
- **Tuke (cubit):** Length from elbow to fingertips.
- **Mārō:** Arm span when stretched out wide horizontally.

(C) Thinking about consistency

What did you notice when measuring? Is everyone's mārō (arm span) the same length?

Why might that be a problem if you're building something together, like a wharenuī?

If everyone's using different measurements, the pieces won't match, and the structure could end up uneven or not fit together properly.

PART 2: ACHIEVING ACCURACY – TOOLS FOR CONSISTENCY

(A) The need for a standard:

Since everyone's body is a little different, using just your own body could lead to variations. How could they ensure measurements stayed consistent, especially for important projects?

Guide towards: To make sure measurements stayed consistent, people would sometimes use the body of **one chosen person** as the standard for that task. This person was often respected, like a chief.

(B) The special rauru!

To ensure accurate measurements and consistent teamwork, the chosen body measurements were sometimes marked onto a wooden rod or cord called a rauru, which served as a shared reference tool for the entire project.

(C) Activity: Make a rauru

- Choose ONE person's measurements to be the 'standard' for your group.
- Use a strip of paper, string or a thin stick.
- Mark the length of that person's **kōnui**, **koiti**, **ringa**, **tuke**, **hau**, and **mārō** onto the 'rauru' tool. Label each mark with the Māori term.
- Use the 'rauru' to measure something else.

PART 3: SYSTEMS AND SIGNIFICANCE

(A) Numbers and measurement:

*The unit **kumi** was a longer unit, equal to ten **maro** or fathoms. What does this suggest about the Māori numbering system?*

Guide towards: The fact that **kumi** is ten times the length of **mārō** suggests that Māori may have used a **base-10 numbering system**, similar to the decimal system used today.

This is considered a crucial step toward developing a more scientific measurement method.

(B) Why these methods worked:

What we have learnt: Pre-European Māori used clever, body-based measurement systems that, while different from modern rulers and tape measures, supported remarkable skill and precision. With just their bodies and simple tools like rods and cords, they created stunning carved buildings, expertly woven textiles, and precise tā moko. These practical and flexible systems empowered expert builders, carvers, and weavers to work with consistency. Māori knowledge and craftsmanship were innovative, grounded in careful observation and deep understanding.

(C) Broader context:

- Mention that using body-part measurements was **not only Māori**; other cultures also used similar methods, i.e., the pyramids.

PART 4: WRAP-UP AND REFLECTION

- *What did you learn about how ancient Māori measured things?*
- *How do their methods compare to how we measure today?*
- *What was innovative about their approach?*
- **Challenge question:** *Why is having a widely agreed-upon standard for measurement important for trade, science, and building projects today?*