Maths Week/ Wiki Pāngarau 2025

Survivor Series/Kia Mōrehurehu

Day 2 Set E

For students

WHAT TO DO FOR STUDENTS

1 **You can work with one or two others. Teams can be different each day.**

2 **Do the tasks and write any working you did, along with your answers, in your maths book.**

3 **Your teacher will tell you how you can get the answers to the questions and/or have your work checked.**

4 **When you have finished each day, your teacher will give you a word or words from a proverb.**

5 **At the end of the week, put the words together in the right order and you will be able to find the complete proverb! Your teacher may ask you to explain what the proverb means.**

6 **Good luck.**

THE SIZE OF IT!

Activity 1 – measurement prefixes

In the **metric system**, a **prefix** is added to a **base unit** (like metre, gram, or litre) to indicate a multiple or fraction of that unit. These prefixes represent powers of ten and help write very large or very small quantities more conveniently.

In the table below are prefixes that are used for measurement. The prefix, symbol and power of ten are given. Working with a partner or in a small group give examples of where you might have heard of or used the prefix before, explaining in words what it means. Two examples are given to help you know what is expected.

Prefix	Symbol	Power of ten	Example of where you have heard or seen this prefix in use
Nano	n	$10^{-9} = \frac{1}{1\,000\,000\,000}$	
Micro	μ	$10^{-6} = \frac{1}{1\,000\,000}$	
Milli	m	$10^{-3} = \frac{1}{1000}$	
Centi	c	$10^{-2} = \frac{1}{100}$	My height is 167 cm, which is the same as 1.67 m (167 ÷ 100). A centimetre is one hundredth of a metre. 100 cm = 1 m.
Deci	d	$10^{-1} = \frac{1}{10}$	
Deca	da	$10^{1} = 10$	
Hecto	h	$10^{2} = 100$	
Kilo	k	$10^{3} = 1000$	

Prefix	Symbol	Power of ten	Example of where you have heard or seen this prefix in use
Mega	M	10^6 = 1 000 000	
Giga	G	10^9 = 1 000 000 000	
Tera	T	10^{12} = 1 000 000 000 000	Two terabytes (TB) of computer storage are 2 000 000 000 000 bytes or 2 x 10^{12} bytes.

Activity 2 – Micro measurements

Micro measurements refer to **very small quantities**—often smaller than the human eye can see. These are typically used in fields like biology, nanotechnology, medicine and electronics.

Complete the table below, making the conversions to metres using the power of ten information from Activity 1.

Object/Entity	Approximate Size	Convert to metres
1. Atom (Hydrogen)	~0.1 nanometres (nm)	
2. Water molecule	~0.275 nanometres (nm)	0.000 000 000 275 m
3. DNA strand width	~2 nanometres (nm)	
4. Virus (e.g., Influenza)	~100 nanometres (nm)	
5. Red blood cell	~7 micrometres (μm)	
6. Inkjet printer dot	~50 micrometres (μm)	
7. Human hair (thickness)	~70 micrometres (μm)	
8. Grain of sand	~0.5 millimetres (mm)	
9. Ant	~5 millimetres (mm)	0.005 m

Activity 3 – Macro measurements

Macro measurements refer to **very large quantities**—things that are easily visible or span great distances. These are used in **engineering**, **astronomy**, **geography** and **architecture**.

Complete the table below, making the conversions to centimetres, metres or kilometres as indicated in the table, using the power of ten information from Activity 1.

Object/Structure	Approximate Size	Convert to the given unit
1. Human (average height)	~1.7 metres (m)	cm
2. School bus	~10 metres (m)	cm
3. Blue whale	~30 metres (m)	cm
4. Football field (length)	~100 metres (m)	km
5. Eiffel Tower	~330 metres (m)	0.33 km
6. Mount Everest	~8,848 metres (m)	km
7. Earth's diameter	~12,742 kilometres (km)	m
8. Distance to the Moon	~384,400 kilometres (km)	m
9. Distance to the Sun	~149.6 million km	149 600 000 000 m

Activity 4 – Standard form

Standard form (also called **scientific notation**) is a way of writing very large or very small numbers in a compact and easy-to-read format using powers of ten.

Write each of the lengths or distances given in metres in standard form. There are five micro measurements and five macro measurements.

Micro measurements

Object/Entity	Measurement	Conversion to metres	Standard Form (m)
1. X-ray wavelength	~0.1 nanometres (nm)	0.000 000 000 1 m	
2. Protein molecule	~5 nanometres (nm)	0.000 000 005 m	5.0×10^{-9} m
3. Cell membrane thickness	~7 nanometres (nm)	0.000 000 007 m	
4. Microchip transistor gate	~50 nanometres (nm)	0.000 000 05 m	
5. Mitochondrion length	~2 micrometres (μm)	0.000 002 m	

Macro measurements

Object/Entity	Measurement	Conversion to metres (m)	Standard Form (m)
6. Golden Gate Bridge	~2.7 kilometres (km)	2700 m	
7. Amazon River (length)	~6 400 kilometres (km)	6 400 000 m	
8. Diameter of Earth	~12 742 kilometres (km)	12 742 000 m	1.2742×10^{7} m
9. Pacific Ocean (width at widest)	~19 800 kilometres (km)	19 800 000 m	
10. Distance from Earth to Mars (avg)	~225 million kilometres	225 000 000 000 m	