

SIZE MATTERS

Challenge



Before you start

Turn on the power, wait till the screen prompts you to press the 'X' button

The universe is made up of huge things and tiny things. How do they all scale up?
Take the 'Size Matters' challenge to find out.

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1. Play the 'Size Matters' game by putting as many objects as possible in size order in one minute. Record your scores in the below table

Name	Score

Units

Large and small distances can be difficult to express in metres.

2. Planet Earth is 12740000m in diameter. Write this in kilometres (km)
[HINT: 1km is 1000m]

3. An average pencil tip is 0.002m. Write this in millimetres (mm)
[HINT: 1m is 1000mm]

4. Place the most appropriate unit next to the object.

Pick the answers from the box below

Length of the River Thames _____

Length of a football pitch _____

Length of a pencil _____

Length of an ant _____

kilometres	centimetres
millimetres	metres

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7. The following table uses a variety of units.

To complete the table you must first convert the unit into metres. Then convert the metres into a power of ten, as before.

How many metres in a kilometre?

How many centimetres in a metre?

How many millimetres in a metre?

Measurement (with units)	Metres (m)	Decimal point								Power of ten	
		1	5	0	0	.					
1.5km	1500	1	5	0	0	.					1.5×10^3
1km						.					
0.5km						.					
100cm						.					
200mm						.					
25mm						.					
2mm	0.0012				0	.	0	0	1	2	1.2×10^{-3}

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8. Unit names

We can use the kilometre unit to describe the length of a river, metres to describe the height of a building or millimetres for the width of a pencil tip.

But what unit best describes the diameter of the visible universe or the width of a DNA molecule?

The table below contains unit names, powers of ten and represents one unit in metres. Complete the table by filling in the empty spaces.

Unit	$=10^?$	One unit written as metres
yottametre	10^{24}	1000000000000000000000000.
exametre	10^{18}	.
gigametre		1000000000.
megametre	10^6	.
	10^3	1000.
metre		.
		0.001
micrometre		0.000 001
nanometre	10^{-9}	0.000 000 001

9. Below is a list of different objects. Which unit name is the most useful to measure it?

[HINT: look at the power of ten, use the table above to help you]

- Black tip reef shark $1.6 \times 10^0 \text{m}$ _____
- Height of Kilimanjaro $5.9 \times 10^3 \text{m}$ _____
- Earth's Moon $3 \times 10^6 \text{m}$ _____ megametre
- Sun $1.4 \times 10^9 \text{m}$ _____
- Plankton $2 \times 10^{-6} \text{m}$ _____
- Width of DNA helix 2.5×10^{-9} _____