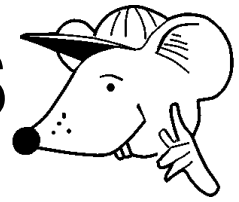


MATHEMATICS



N.S. Yr. 6 P.91

**Measures - vocabulary and relationships
between familiar units.**

Equipment

Paper, pencil.

MathSphere

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Concepts

Children should know and use the following vocabulary: *unit, standard unit, metric unit, imperial unit*

kilometre, metre, centimetre, millimetre, kilogram, gram, litre, millimetre, tonne, centilitre mile, pint, gallon, pound (lb), ounce (oz), yard, foot

long, short, tall, high, low, wide, narrow, deep, shallow, thick, thin

far, near, close, distance, perimeter, circumference

big, bigger, small, smaller, balances

heavy, light, weighs

full, empty, holds

longer, longest etc

Children should be developing a good working knowledge of units in common use, both metric and imperial.

They should know the following abbreviations:

mm (millimetre), cm (centimetre), m (metre), km (kilometre)

g (gram), kg (kilogram), ml (millilitre), l (litre), cl (centilitre)

cm² (square centimetre), m² (square metre), mm² (square millimetre), N (newton)

In addition to the units given in previous modules, they should know the following relationships between metric units:

1 tonne = 1 000 kilograms

1 litre = 100 centilitres

1 centilitre = 10 millilitres

They should also know common imperial units:

1 litre = approx 2 pints (more accurately 1³/₄ pints)

4.5 litres = approx 1 gallon or 8 pints

1 kilogram = approx 2 lb (more accurately 2.2lb)

30 g = approx 1 oz

8 kilometres = approx 5 miles

They should know the equivalent of one thousandth of 1km, 1m, 1 kg, 1 litre respectively in smaller units.

Eg. know that one thousandth of a litre is 1 millilitre.

They should begin to write larger units in terms of smaller units.

Eg. 7.845 km is 7 845 m

etc.

Imperial Units

These are the imperial units still in use:

Mile.

A mile is a unit of distance and is about 1 600 metres long (a little over 1.5 km).
5 miles is approximately 8 kilometres.

Pint.

A pint measures capacity (volume) and is about 570ml (a little over half a litre).
One litre is approximately $1\frac{3}{4}$ pints.

Gallon.

A gallon is a unit of capacity and is about 4.5 litres.

Foot.

A foot is a unit of length and is about 30cm long.

Yard

A yard is a unit of length and is about 91 cm.

Inch.

An inch is a unit of length and is about $2\frac{1}{2}$ cm long.

Pound.

A pound is a unit of mass and is about half a kilogram.
Two pounds (more accurately 2.2 pounds) is about one kilogram.

Ounce

An ounce is a unit of mass and is about 30g.

Converting imperial units to metric units and vice versa

Complete this table to convert the metric units given to imperial units or the imperial units given to metric units.

Imperial units	Metric units
3 miles	_____m
15 miles	_____km
_____pints	10 litres
5 gallons	_____litres
10 m	_____yards
_____inches	20cm
_____lb	24 kg
12 oz	_____g
6 ft	_____cm
8 yds	_____cm
_____gallons	20 l

Divvy, working out these conversions is harder than learning the metric system!

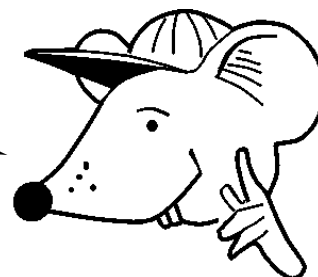


I know, Addy, I know!



You should now be able to write small units as large units and large units as small units.

Try this with the measurements in the table.



Small units	Large units
Eg. 4 000kg	4t
6 574g	_____kg
_____cm	5.63m
943cm	_____m
_____mm	7.321m
9 529ml	_____l
_____ml	8.623 l
_____g	83kg
99cm	_____m
764cl	_____l
_____t	5 733kg
8 316mm	_____m
_____cl	12 l
12 634m	_____km
955m	_____km



Do you have trouble thinking what a tonne looks like?

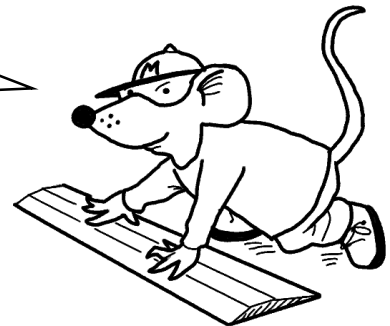
The 'size' of a tonne depends on the material used to make it.

A tonne of steel will obviously be smaller in size than a tonne of water.

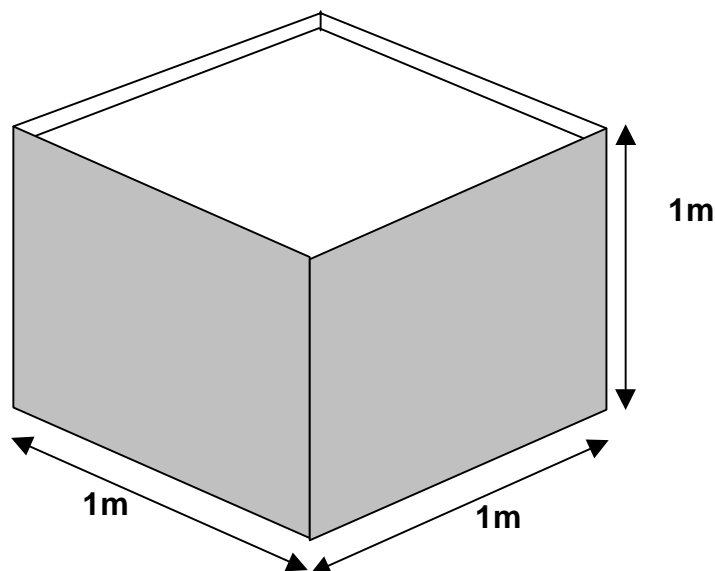
A tonne is the mass of a cubic metre of water.

Imagine a box in the shape of a cube 1m by 1m by 1m.

If this were filled with water, the water would weigh a tonne. Easy, really!



This amount of water weighs one tonne!

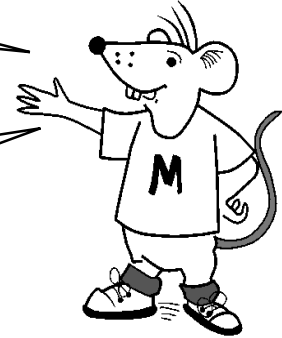


If a swimming pool is **2m** deep, **6m** wide and **25m** long, what is the mass of the water in the pool?



Do you know the difference between **mass** and **weight**?

It is confusing because in everyday life we mix them up without thinking.



Mass

Mass is the **amount of material** in an object and is measured in **kilograms**. This stays the same wherever you take the object.

Weight

Weight is the **force by which the Earth (or other planet) pulls the object down** and is measured in **newtons**. This changes depending on where you take the object.

For example, if your **mass** is **40 kg**, you will have a **mass** of **40 kg** whether you are on the Earth, on Mars or on the Moon, because your body has the same amount of material wherever you are.

However, your **weight** will change because the gravity on Mars and the Moon is not as great as that on the Earth. On Earth your **weight** would be about **400 newtons**, on Mars it would be about **152 newtons** and on the Moon only about **66 newtons**.

Nelly the elephant was invited to the ball, but when she tried to put on her best dress she realised she had eaten so many buns she no longer fitted into it. She had heard, however, that astronauts were weightless in space, so she hitched a lift on the Space Shuttle.

Unfortunately, when she was in space she soon discovered that, although she didn't have any weight, she still had plenty of mass!

Michael was asked in a science test: 'What is the difference between mass and weight?'

He wrote: 'Mass is when you buy a bag of potatoes. Weight is when you have to carry them home!'

You should be familiar enough with the units of measurement now to answer these questions.



1. What is **one half** of these units. Give your answer in smaller units.
Eg. One **half** of a **kilometre** is **500 metres**.
a. kilometre b. metre c. kilogram d. litre e. centimetre
2. What is **one quarter** of these units. Give your answer in smaller units.
a. kilometre b. metre c. kilogram d. litre
3. What is **three quarters** of these units. Give your answer in smaller units.
a. kilometre b. metre c. kilogram d. litre
4. What is **one tenth** of these units. Give your answer in smaller units.
a. kilometre b. metre c. kilogram d. litre e. centimetre
5. What is **one hundredth** of these units. Give your answer in smaller units.
a. kilometre b. metre c. kilogram d. litre
6. What is **one thousandth** of these units. Give your answer in smaller units.
a. kilometre b. metre c. kilogram d. litre e. tonne

Answers

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Imperial	Metric
3 miles	4 800m
15 miles	24km
17.5 pints	10 l
5 gallons	22.5 l
10m	10.99 (say 11) yds
8 in	20 cm
52.8 lb	24kg
12oz	360g
6 ft	180cm
8yds	728 cm
4.4 galls	20 l

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4 000g	4t
6 574g	6.574kg
563cm	5.63m
943cm	9.43m
7 321mm	7.321 m
9 529ml	9.529 l
8 623ml	8.623 l
83 000g	83kg
99cm	0.99m
764cl	7.64 l
5.733t	5 733kg
8316mm	8.316m
1 200cl	12 l
12 634m	12.634km
955m	0.955km

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Water in the swimming pool weighs 300 tonnes

Answers (Contd)

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- | | | | | | | | | | |
|--------------|------|-----------|------|-----------|------|-----------|-------|-----------|-----|
| 1. a. | 500m | b. | 50cm | c. | 500g | d. | 500ml | e. | 5mm |
| 2. a. | 250m | b. | 25cm | c. | 250g | d. | 250ml | | |
| 3. a. | 750m | b. | 75cm | c. | 750g | d. | 750ml | | |
| 4. a. | 100m | b. | 10cm | c. | 100g | d. | 100ml | e. | 1mm |
| 5. a. | 10m | b. | 1cm | c. | 10g | d. | 10ml | | |
| 6. a. | 1m | b. | 1mm | c. | 1g | d. | 1ml | e. | 1kg |