19. [Units of Measurement]

Skill 19.1 Selecting the appropriate units of measurement.

MM5 1 1 2 2 3 3 4 4
MM6 1 1 2 2 3 3 4 4

- Compare the size, mass or capacity to that of common objects (tennis court, bag of flour or carton of milk).
- Consider any standard units you know, chosen because they are sensible and accurate.
  Example: Carpenters measure wood lengths in millimetres.
  Height of a person is measured in centimetres.
  Mountains are measured in metres.

Q. Choose the appropriate units: grams, kilograms or tonnes.
"The total amount of salt a healthy person should eat each day is 6..."

A. ***grams***

The weight of the nutritional elements of food are usually measured in grams or milligrams.
Compare the amount of salt to known amounts of a single unit e.g.
1 kilogram of sugar or a 1 tonne truck.

a) Choose the appropriate units: millilitres, litres or megalitres.
"A water tap that drips every second would, each year, waste 10000..."

litres

b) Choose the appropriate units: millilitres, litres or megalitres.
"The capacity of one cup is about 250..."

c) Choose the appropriate units: centimetres, metres or kilometres.
"The highest peak in the Antartic is Mt Vinson with a height of 5140...

d) Choose the appropriate units: grams, kilograms or tonnes.
"The heaviest animal, the blue whale, weighs about 90..."

e) Choose the appropriate units: centimetres, metres or kilometres.
"From the Snowy Mountains to the Southern Ocean, the Murray River has a length of 2530...

f) Choose the appropriate units: centimetres, metres or kilometres.
"The world's tallest waterfall is Angel Falls in Venezuela measuring 979..."

g) Choose the appropriate units: millilitres, litres or megalitres.
"The amount of juice in an average lemon is about 35..."

h) Choose the appropriate units: grams, kilograms or tonnes.
"The average amount of rubbish produced by every Australian each year is 1..."

Q. How many of these objects are likely to have a capacity of less than 1 litre?

- A soap dispenser ☑
- A bath ☐
- A perfume bottle ☑
- A hand basin ☐

A. *2*

Compare the capacity of each object to that of a standard object that you know e.g. 1 litre of milk.

Only the soap dispenser and perfume bottle would be likely to have a capacity of less than 1 litre.

a) How many of these objects are likely to have a capacity of greater than 1 litre?

- A human mouth ☐
- A soft drink can ☐
- A bird bath ☑
- A salt shaker ☐

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b) How many of these objects are likely to have a mass of less than 1 kilogram?

- A dozen eggs ☐
- A block of chocolate ☐
- A loaf of bread ☐
- A box of washing powder ☐

c) How many of these objects are likely to have an area of more than 1 square metre?

- An open book ☐
- A doona ☐
- A cinema screen ☐
- A bath mat ☐

d) How many of these objects are likely to have a temperature of greater than 30 degrees Celsius?

- A lake ☐
- A person ☐
- A furnace ☐
- A cellar ☐

e) How many of these objects are likely to have a mass of less than 1 tonne?

- An ocean liner ☐
- A helium balloon ☐
- A Great Dane ☐
- A Murray Grey bull ☐

f) How many of these places are likely to have an area of less than 1 hectare?

- Tooronga Zoo ☐
- Kakadu National Park ☐
- Centre court - Wimbledon ☐
- Melbourne Cricket Ground ☐

g) How many of these objects are likely to have a temperature of less than 30 degrees Celsius?

- A salad ☐
- An ice cream ☐
- A bowl of soup ☐
- A glass of tap water ☐

h) How many of these objects are likely to have a capacity of less than 1 litre?

- A cattle trough ☐
- A toilet cistern ☐
- A baby's bottle ☐
- A wheel barrow ☐

Skill 19.3 Converting length units.

To change from **smaller** units to **larger** units

- Divide by the conversion factor (because you need less).

  Example: To change 40 mm to cm ÷ by 10

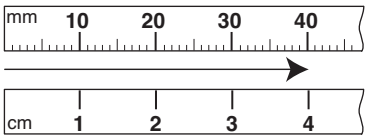
Hint: Conversion Facts

1 km = 1000 m = 100 000 cm = 1 000 000 mm
1 m = 100 cm = 1000 mm
1 cm = 10 mm

To change from **larger** units to **smaller** units

- Multiply by the conversion factor (because you need more).

  Example: To change 4 cm to mm × by 10



Q. Which is greater:
600 cm or 50 000 mm?

A. *600 cm × 10*
= 6000 mm
50 000 mm

Decide which unit to convert.
To convert cm to mm, multiply by 10.

a) Write in metres:

1000 cm = 10 m

100 cm = 1 m so 1000 ÷ 100 =

b) Write in centimetres:

100 mm = cm

c) Write in metres:

3 km = m

d) Write in millimetres:

60 cm = mm

e) Express in metres:

500 cm + 3 m = m

f) Express in millimetres:

4 cm + 200 mm = mm

g) Which is greater:
2 km or 1500 m?

h) Which is greater:
4000 cm or 3 m?

i) Place the following in order of increasing length:
60 m, 6 km, 60 000 cm.

j) Place the following in order of increasing length:
3 m, 20 000 mm, 1000 cm.

Skill 19.4 Converting mass units.

To change from **smaller** units to **larger** units

- Divide by the conversion factor (because you need less).

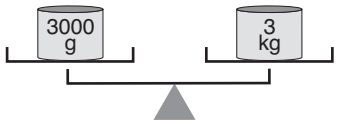
  Example: To change 3000 g to kg ÷ by 1000

To change from **larger** units to **smaller** units

- Multiply by the conversion factor (because you need more).

  Example: To change 3 kg into g × by 1000

Hint: Conversion Facts
1 tonne = 1000 kg = 1 000 000 g
1 kg = 1000 g



Q. Express in grams:
4 g + 3 kg =

A. 4 g + 3 kg
= *4 + 3000 g*
= ***3004*** *g*

To convert kg to g, multiply by 1000.
3 kg ⇒ 3 × 1000 = 3000 g

a) Write in grams:
20 kg = 20 000 g

1 kg = 1000 g so 20 × 1000 =

b) Write in kilograms:
1 t = kg

c) Write in tonnes:
13 000 kg = t

d) Write in grams:
4 kg = g

e) Express in grams:
3 g + 4 kg = g

f) Express in tonnes:
7 t + 1000 kg = t

g) Which is greater:
19 kg or 2000 g?

h) Which is greater:
7 t or 800 kg?

i) Place the following in order of increasing mass:
2 kg, 30 t, 4000 g.

j) Place the following in order of increasing mass:
3000 kg, 30 t, 30 000 g.

Skill 19.5 Converting capacity units.

To change from **smaller** units to **larger** units

- Divide by the conversion factor (because you need less).

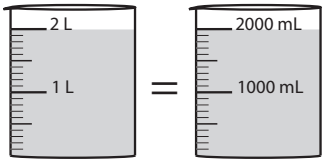
  Example: To change 2000 mL to L ÷ by 1000

To change from **larger** units to **smaller** units

- Multiply by the conversion factor (because you need more).

  Example: To change 2 L to mL × by 1000

Hint: Conversion Facts
1 ML (megalitre) = 1 000 kL = 1 000 000 L
1 kL = 1000 L
1 L = 1000 mL (millilitre)



Q. Place the following in order of increasing capacity:
6000 mL, 5 L, 600 mL.

A. *6000 mL*
5L × 1000 = 5000 mL
600 mL
⇒ ***600 mL, 5L, 6000 mL***

Change each amount to the same unit.
To convert L to mL, multiply by 1000.

a) Write in ML:

20 000 kL = 20 ML

1000 kL = 1 ML so 20 000 ÷ 1000 =

b) Write in mL:

1 L = mL

c) Write in litres:

5000 mL = L

d) Write in kilolitres:

3 000 000 L = kL

e) Express in litres:

12 L + 2000 mL = L

f) Express in millilitres:

3 mL + 2 L = mL

g) Which is greater:
40 000 mL or 4 L?

h) Which is greater:
1000 kL or 10 000 L?

i) Place the following in order of increasing capacity:
6000 mL, 5 kL, 700 L.

j) Place the following in order of increasing capacity:
1000 mL, 9 L, 900 mL.

Q. One lap of the oval fountain in Hyde Park, London is 21 000 cm. How many metres is this?

A. $21\,000 \div 100 = \mathbf{210}\ m$

To convert cm to m divide by 100.

a) How many metres above sea level is Arthurs Seat, the highest point on Victoria's Mornington Peninsula, if it is 300 times the height of a 100 cm person?

$100 \times 300 = 30\,000\ cm$

$30\,000 \div 100 =$ 300 m

b) How many basketballs, each with a mass of 620 g, can be taken by the coach on to the plane if there is only two and a half kilograms allowed?

c) How many 250 mL cups are necessary to fill a 3 L vase?

d) An average orange has a mass of 200 g. How many oranges would you expect to find in a 3 kg bag?

e) A half flush of a toilet uses 6 L of water. How many millilitres is this?

mL

f) Charlie's average stride length is 80 cm. At this rate, how many steps would he take to run the 400 m?

steps

g) How many metres above ground is Uluru if it is 136 times the height of a 250 cm tree?

m

h) A 50c piece is about 32 mm wide. How many 50c pieces, end to end, would you need to run the length of a table that is 512 cm long?