

16. [Units of Measurement]

Skill 16.1 Selecting the appropriate units of measurement.

MM3.2 1 1 2 2 3 3 4 4
MM4.1 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 10 000..."

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 Antarctica 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 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 greater than 1 litre?

- A human mouth
- A soft drink can
- A bird bath 1
- A salt shaker

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

- An ocean liner
- A helium balloon
- A Great Dane
- A motorbike

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

- Auckland Zoo
- Kakadu National Park
- Centre court - Wimbledon
- Eden Park

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

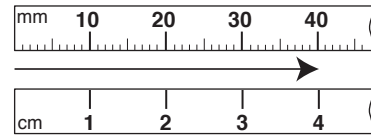
- A salad
- An ice cream
- A bowl of soup
- A glass of tap water

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

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

Conversion Facts - LENGTH

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



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

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. $600 \text{ cm} \times 10$
 $= 6000 \text{ mm}$
50 000 mm is greater

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

a) Convert to metres:

1000 cm = m

$100 \text{ cm} = 1 \text{ m so } 1000 \div 100 =$

b) Convert to centimetres:

100 mm = cm

c) Convert to metres:

3 km = m

d) Convert to millimetres:

60 cm = mm

e) Convert to metres:

1500 cm = m

f) Convert to millimetres:

10 m = mm

g) Convert to kilometres:

8000 m = km

h) Convert to centimetres:

900 mm = cm

i) Convert to millimetres:

2.4 cm = mm

j) Convert to metres:

3.75 km = m

k) Convert to centimetres:

1.9 m = cm

l) Convert to millimetres:

1.36 m = mm

Skill 16.3 Converting units of length (2).

MM3.2 11 22 33 44
MM4.1 11 22 33 44

m) Express in metres:

$$500 \text{ cm} + 3 \text{ m} = \boxed{} \text{ m}$$

n) Express in millimetres:

$$4 \text{ cm} + 200 \text{ mm} = \boxed{} \text{ mm}$$

o) Express in metres:

$$7 \text{ km} + 3100 \text{ m} = \boxed{} \text{ m}$$

p) Express in metres:

$$6.15 \text{ km} + 400 \text{ m} = \boxed{} \text{ m}$$

q) Express in kilometres:

$$12 \text{ km} + 6000 \text{ m} = \boxed{} \text{ km}$$

r) Express in centimetres:

$$4.5 \text{ m} + 30 \text{ cm} = \boxed{} \text{ cm}$$

s) Which is greater?

2 km or 1500 m

t) Which is greater?

4000 cm or 3 m

u) Which is greater?

21 cm or 900 mm

v) Which is greater?

30 cm or 3000 mm

w) Circle the longest distance.

60 m 6 km 60 000 cm

convert all units to metres

$$6 \text{ km} = 6000 \text{ m}$$

$$60\ 000 \text{ cm} = 600 \text{ m}$$

x) Circle the shortest distance.

3 m 20 000 mm 1000 cm

y) Circle the shortest distance.

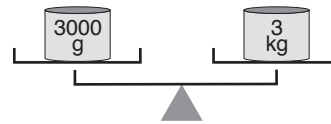
2 km 200 m 2000 cm

z) Circle the longest distance.

3000 m 2 km 10 000 cm

Conversion Facts - MASS

1 tonne = 1000 kg = 1 000 000 g
1 kg = 1000 g



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

Q. Express in grams:

$4\text{ g} + 3\text{ kg} = \boxed{}\text{ g}$

A. $4\text{ g} + 3\text{ kg} =$
 $= 4\text{ g} + 3000\text{ g}$
 $= \mathbf{3004\text{ g}}$

To convert kg to g,
multiply by 1000.
 $3\text{ kg} \Rightarrow$
 $3 \times 1000 = 3000\text{ g}$

a) Convert to grams:

$20\text{ kg} = \boxed{20\ 000}\text{ g}$

$1\text{ kg} = 1000\text{ g}$ so $20 \times 1000 =$
.....

b) Convert to kilograms:

$1\text{ t} = \boxed{}\text{ kg}$

c) Convert to tonnes:

$13\ 000\text{ kg} = \boxed{}\text{ t}$

d) Convert to grams:

$4\text{ kg} = \boxed{}\text{ g}$

e) Convert to grams:

$1\text{ kg} = \boxed{}\text{ g}$

f) Convert to kilograms:

$3\text{ t} = \boxed{}\text{ kg}$

g) Convert to tonnes:

$70\ 000\text{ kg} = \boxed{}\text{ t}$

h) Convert to kilograms:

$22\ 000\text{ g} = \boxed{}\text{ kg}$

i) Convert to grams:

$0.5\text{ kg} = \boxed{}\text{ g}$

j) Convert to kilograms:

$2.3\text{ t} = \boxed{}\text{ kg}$

k) Convert to grams:

$4.6\text{ kg} = \boxed{}\text{ g}$

l) Convert to kilograms:

$0.9\text{ t} = \boxed{}\text{ kg}$

Skill 16.4 Converting units of mass (2).

MM3.2 11 22 3 44
MM4.1 11 22 33 44

m) Express in grams:

$$3 \text{ kg} + 150 \text{ g} = \boxed{} \text{ g}$$

n) Express in kilograms:

$$1 \text{ t} + 420 \text{ kg} = \boxed{} \text{ kg}$$

o) Express in grams:

$$3 \text{ g} + 4 \text{ kg} = \boxed{} \text{ g}$$

p) Express in tonnes:

$$7 \text{ t} + 1000 \text{ kg} = \boxed{} \text{ t}$$

q) Express in grams:

$$6.9 \text{ kg} + 300 \text{ g} = \boxed{} \text{ g}$$

r) Express in kilograms:

$$0.8 \text{ t} + 2000 \text{ kg} = \boxed{} \text{ kg}$$

s) Which is greater?

19 kg or 2000 g

t) Which is greater?

2 t or 800 kg

u) Which is greater?

3 t or 6000 kg

v) Which is greater?

900 g or 3 kg

w) Circle the greatest mass.

20 kg 2 t 2000 g

convert all units to kilograms

$$2 \text{ t} = 2000 \text{ kg}$$

$$2000 \text{ g} = 2 \text{ kg}$$

x) Circle the smallest mass.

3000 kg 30 t 30 000 g

y) Circle the smallest mass.

13 000 g 0.5 t 750 kg

z) Circle the greatest mass.

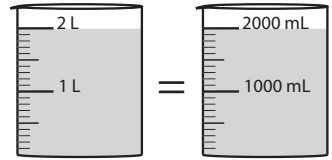
4 t 400 000 g 40 000 kg

Conversion Facts - CAPACITY

1 ML (megalitre) = 1 000 kL = 1 000 000 L

1 kL = 1000 L

1 L = 1000 mL (millilitre)



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

Q. Circle the smallest capacity.

6000 mL 5 L 600 mL

A. $5\text{ L} \times 1000 = 5000\text{ mL}$

The smallest capacity is 600 mL.

6000 mL 5 L **600 mL**

Change each amount to the same unit (mL).

To convert L to mL, multiply by 1000.

a) Convert to litres:

20 000 mL = L

1000 mL = 1 L so 20 000 ÷ 1000 =

b) Convert to millilitres:

1 L = mL

c) Convert to litres:

5000 mL = L

d) Convert to litres:

3 000 000 mL = L

e) Convert to litres:

78 000 mL = L

f) Convert to millilitres:

2.6 L = mL

g) Convert to millilitres:

5.8 L = mL

h) Convert to millilitres:

0.7 L = mL

Skill 16.5 Converting units of capacity (2).

MM3.2 11 22 3 4 4
MM4.1 11 22 3 3 4 4

i) Express in litres:

$$12 \text{ L} + 2000 \text{ mL} = \boxed{} \text{ L}$$

j) Express in millilitres:

$$800 \text{ mL} + 3.2 \text{ L} = \boxed{} \text{ mL}$$

k) Express in litres:

$$5000 \text{ mL} + 6 \text{ L} = \boxed{} \text{ L}$$

l) Express in millilitres:

$$1.7 \text{ L} + 200 \text{ mL} = \boxed{} \text{ mL}$$

m) Which is greater?

40 000 mL or 4 L

n) Which is greater?

100 L or 10 000 mL

o) Which is greater?

6000 mL or 12 L

p) Which is greater?

5.2 L or 10 000 mL

q) Circle the greatest capacity.

60 000 mL 50 L 7.5 L

convert all units to millilitres

$$50 \text{ L} = 50000 \text{ mL}$$

$$7.5 \text{ L} = 7500 \text{ mL}$$

r) Circle the smallest capacity.

1000 mL 9 L 900 mL

s) Circle the smallest capacity.

4000 mL 3.5 L 40 L

t) Circle the greatest capacity.

28 L 2800 mL 3000 mL

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

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

To convert cm to m divide by 100.

a) The Fox Glacier ends at a point above sea level that is 300 times the height of a 100 cm person? At what height above sea level is this?

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

$30\,000 \div 100 = \boxed{300\,m}$

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 walk the 400 m?

.....
..... =

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

.....
..... = m

h) A 50¢ piece is about 25 mm wide. How many 50¢ pieces, end to end, would you need to run the length of a table that is 400 cm long?

.....
..... =

