

# 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 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 Antarctic 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  1
- A salt shaker

**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 16.3 Converting length units.

MM3.2 1 1 2 2 3 3 4 4  
MM4.1 1 1 2 2 3 3 4 4

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

$$1 \text{ km} = 1000 \text{ m} = 100\,000 \text{ cm} = 1\,000\,000 \text{ mm}$$

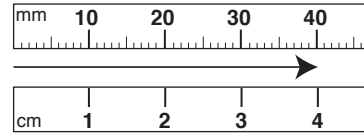
$$1 \text{ m} = 100 \text{ cm} = 1000 \text{ mm}$$

$$1 \text{ cm} = 10 \text{ mm}$$

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

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

**a)** Write in metres:

$$1000 \text{ cm} = \boxed{10} \text{ m}$$

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

**b)** Write in centimetres:

$$100 \text{ mm} = \boxed{\phantom{00}} \text{ cm}$$

**c)** Write in metres:

$$3 \text{ km} = \boxed{\phantom{000}} \text{ m}$$

**d)** Write in millimetres:

$$60 \text{ cm} = \boxed{\phantom{000}} \text{ mm}$$

**e)** Express in metres:

$$500 \text{ cm} + 3 \text{ m} = \boxed{\phantom{000}} \text{ m}$$

**f)** Express in millimetres:

$$4 \text{ cm} + 200 \text{ mm} = \boxed{\phantom{000}} \text{ mm}$$

**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 16.4 Converting mass units.

MM3.2 11 22 344  
MM4.1 11 22 3344

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

Hint: Conversion Facts

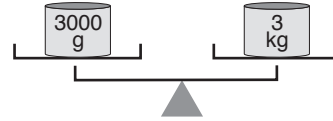
1 tonne = 1000 kg = 1000 000 g

1 kg = 1000 g

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:

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

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

To convert kg to g,  
multiply by 1000.

$$3 \text{ kg} \Rightarrow 3 \times 1000 = 3000 \text{ g}$$

a) Write in grams:

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

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

b) Write in kilograms:

$$1 \text{ t} = \boxed{\phantom{000}} \text{ kg}$$

c) Write in tonnes:

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

d) Write in grams:

$$4 \text{ kg} = \boxed{\phantom{000}} \text{ g}$$

e) Express in grams:

$$3 \text{ g} + 4 \text{ kg} = \boxed{\phantom{000}} \text{ g}$$

f) Express in tonnes:

$$7 \text{ t} + 1000 \text{ kg} = \boxed{\phantom{000}} \text{ t}$$

g) Which is greater?

$$19 \text{ kg or } 2000 \text{ g} \quad \boxed{\phantom{000}}$$

h) Which is greater?

$$7 \text{ t or } 800 \text{ kg} \quad \boxed{\phantom{000}}$$

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, 30000 g.

## Skill 16.5 Converting capacity units.

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

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

**Hint: Conversion Facts**

1 ML (megalitre) = 1000 kL = 1 000 000 L

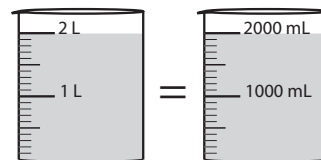
1 kL = 1000 L

1 L = 1000 mL (millilitre)

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.** Place the following in order of increasing capacity:

6000 mL, 5 L, 600 mL.

**A.** 6000 mL

5 L × 1000 = 5000 mL

600 mL

⇒ **600 mL, 5 L, 6000 mL**

Change each amount to the same unit.

To convert L to mL, multiply by 1000.

**a)** Write in megalitres:

20 000 kL =  ML

1000 kL = 1 ML so 20 000 ÷ 1000 =

**b)** Write in millilitres:

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.**  $21\,000 \div 100 = 210\text{ m}$  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?

$100 \times 300 = 30\,000\text{ cm}$

$30\,000 \div 100 =$   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?

.....  
  
 .....

**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 32 mm wide. How many 50¢ pieces, end to end, would you need to run the length of a table that is 512 cm long?

.....  
  
 .....