



Unit 16: Measure – converting units

Lesson 1: Metric units (1)

→ pages 111–113

- To convert metres into kilometres, divide by 1,000.
 $162,000 \text{ m} \div 1,000 = 162 \text{ km}$
 London → Birmingham = 162 km
 - To convert kilometres into metres, × by 1,000.
 $50 \text{ km} \times 1,000 = 50,000 \text{ m}$
 Manchester → Liverpool = 50,000 m
 - Glasgow → Edinburgh = 67.1 km
- Letters written into circles:
 A and D → ÷ 1,000
 B and C → × 1,000
- $12 \text{ kg} = 12,000 \text{ g}$
 - $8,000 \text{ g} = 8 \text{ kg}$
 - $6,500 \text{ g} = 6 \text{ kg and } 500 \text{ g}$
 - $3.4 \text{ kg} = 3,400 \text{ g}$
 - $10 \text{ kg } 200 \text{ g} = 10,200 \text{ g}$
 $10 \text{ kg } 200 \text{ g} = 10.2 \text{ kg}$
 - $4 \text{ kg } 3,000 \text{ g} = 7,000 \text{ g}$
 $4 \text{ kg } 3,000 \text{ g} = 7 \text{ kg}$
- To convert from kilograms to grams Kate needs to multiply by 1,000. Her mistake is that she has divided instead of multiplied.
 $27.5 \text{ kg} = 27,500 \text{ g}$
- Possible distances: 0.4 km, 0.5 km, 4.0 km or 5.0 km
 Answers in metres: 4,500 m, 5,400 m, 40,500 m, 50,400 m
- 2 bags: $18,000 \text{ g} = 18 \text{ kg}$ and $8,000 \text{ g} = 8 \text{ kg}$
 Explanations will vary; for example:
 Masses that are multiples of 1,000 g are a whole number of kilograms.

Reflect

Explanations may vary; for example:

To convert grams into kilograms divide by 1,000.

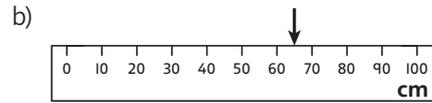
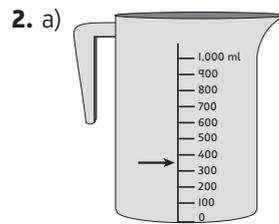
$$12,500 \div 1,000 = 12.5$$

So, $12,500 \text{ g} = 12.5 \text{ kg}$

Lesson 2: Metric units (2)

→ pages 114–116

- To convert mm into cm, divide by 10.
 $30 \text{ mm} \div 10 = 3 \text{ cm}$
 The blade of grass is 3 cm long.
 - To convert litres into millilitres, multiply by 1,000.
 $1.2 \text{ l} \times 1,000 = 1,200 \text{ ml}$
 The bottle holds 1,200 ml.



- Lines drawn to join strategy and task:
 ÷ 10 → Measure the width of a stamp in mm and convert it into cm.
 × 10 → Change the height of a flower (in cm) into mm.
 ÷ 1,000 → Convert an amount of water from millilitres into litres.
 × 1,000 → Convert the mass of a bag of sand (in kg) into g.
 ÷ 100 → Write a length in cm as m.
 × 100 → Convert the height of a building (in m) into cm.
- $4,000 \text{ ml} = 4 \text{ l}$
 - $15 \text{ l} = 15,000 \text{ ml}$
 - $7.2 \text{ l} = 7 \text{ l and } 200 \text{ ml}$
 - $1,600 \text{ ml} = 1.6 \text{ l}$
 - $12 \text{ l } 500 \text{ ml} = 12,500 \text{ ml}$
 $12 \text{ l } 500 \text{ ml} = 12.5 \text{ l}$
 - $9 \text{ l } 2,500 \text{ ml} = 11,500 \text{ ml}$
 $9 \text{ l } 2,500 \text{ ml} = 11.5 \text{ l}$
- To convert from centimetres to millimetres you multiply by 10, so Mo is correct since his measurement (in millimetres) is 10 times Lee's (measured in centimetres).

6.

First cup	Second cup	Third cup	Total
C	C	A	0.5 l
A	B	B	0.25 l
C	B	B	0.35 l
C	A	B	0.375 l

Reflect

Danny is wrong. Explanations may vary; for example:

It is true that 10 mm is equal to 1 cm but Danny needs to multiply by 10 to convert cm into mm, rather than dividing. So, $5.6 \text{ cm} = 56 \text{ mm}$.

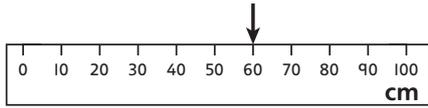
Lesson 3: Metric units (3)

→ pages 117–119

- $7,200 \text{ ml} + 1,000 \text{ ml} = 8,200 \text{ ml}$
 - $6.2 \text{ kg} + 2,000 \text{ g} = 6,200 \text{ g} + 2,000 \text{ g} = 8,200 \text{ g}$
 - In each of these examples, I converted the numbers by multiplying by 1,000.



2. 60 centimetres are left.



3. a) $800\text{ g} + \frac{1}{2}\text{ kg}$ $800\text{ g} + \frac{1}{2}\text{ kg}$
 $= 800\text{ g} + 500\text{ g}$ $= 0.8\text{ kg} + 0.5\text{ kg}$
 $= 1,300\text{ g}$ $= 1.3\text{ kg}$
- b) $10.5\text{ cm} - 62\text{ mm}$ $10.5\text{ cm} - 62\text{ mm}$
 $= 10.5\text{ cm} - 6.2\text{ cm}$ $= 105\text{ mm} - 62\text{ mm}$
 $= 4.3\text{ cm}$ $= 43\text{ mm}$

4. C, B, A, D

5. a) $1.1\text{ litres} = 1,100\text{ ml}$
 $1,100\text{ ml} - 300\text{ ml} = 800\text{ ml}$
 Richard has 800 ml of squash left.
- b) Each glass has 200 ml of squash.

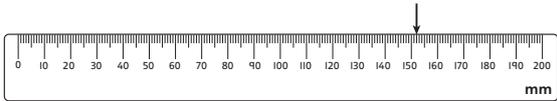
Reflect

Explanations may vary; for example:

First convert 0.6 km to m by multiplying by 1,000.
 $0.6 \times 1,000 = 600$
 $250\text{ m} + 600\text{ m} = 850\text{ m}$

Lesson 4: Metric units (4)

→ pages 120–122

1. a) $10\text{ mm} = 1\text{ cm}$
 To convert from mm to cm, divide by 10.
- b) $100\text{ cm} = 1\text{ m}$
 $1,000\text{ m} = 1\text{ km}$
 $100 \times 1,000 = 100,000$
 To convert from cm to km, \div by 100,000.
 To convert from km to cm, \times by 100,000.
2. a) The mouse's tail is 14.2 cm long.
 Check that children have drawn tails that are 14.2 cm long.
- b) $40,000\text{ cm} = 400\text{ m} = 0.4\text{ km}$
3. Lexi, Reena, Ebo, Max
4. a) Danny has treated the length of the ribbon as if it was 2 cm. The length of 2 m needs to be converted to cm ($2 \times 100 = 200\text{ cm}$) so that the length and width are in the same units before carrying out his calculation.
- b) The perimeter is $406\text{ cm} = 4.06\text{ m}$.
5. a) 
- b) The cola will travel 7,582 cm.
- c) $310\text{ mm} = 31\text{ cm}$
 So, any person who is less than 31 cm in width can walk down it, but it would be very narrow.

Reflect

Answers will vary; for example:

There are 10 mm in 1 cm.

There are 100 cm in 1 m.

There are 1,000 ml in 1 l / There are 1,000 g in 1 kg /

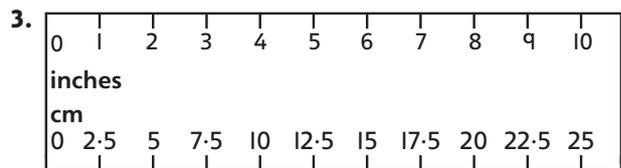
There are 1,000 mm in 1 m / There are 1,000 m in 1 km.

Lesson 5: Imperial units of length

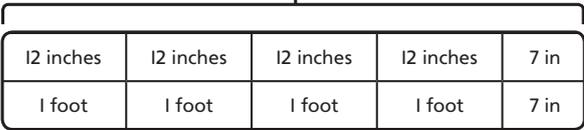
→ pages 123–125

1. a) Circled: 10 inch pizza
 Park 100 yards
 Amal 6 feet 2 inches
- b) 1 inch is approximately $2\frac{1}{2}\text{ cm}$.
 1 foot is equal to 12 inches.
 1 yard is equal to 3 feet.

2. $4 \times 12 = 48$
 The snake is 48 inches long.



4. a) a 48 inch chimpanzee
 $(3\frac{1}{2}\text{ ft} = 36 + 6 = 42\text{ inches or } 48\text{ inches} = 4\text{ ft})$
- b) 21 foot patio
 $(6\text{ yards} = 6 \times 3 = 18\text{ ft or } 21\text{ ft} = 21 \div 3 = 7\text{ yards})$
5. $20\text{ yards} = 20 \times 90\text{ cm} = 1,800\text{ cm} = 18\text{ m}$
 $100\text{ yards} = 100 \times 90\text{ cm} = 9,000\text{ cm} = 90\text{ m}$
 20 yards is about 18 m. 100 yards is about 90 m.

6. 

12 inches	12 inches	12 inches	12 inches	7 in
1 foot	1 foot	1 foot	1 foot	7 in

$= 4\text{ ft } 7\text{ in}$
 $= 1\text{ yd } 1\text{ ft } 7\text{ in}$

7. a) Jamie is confusing yards and feet; she means 2 yards which is 6 feet.
- b) Answers will vary. Check that children have correctly converted between centimetres and feet and inches.

Reflect

Answers will vary; for example:

Imperial units were used in the UK until they were replaced by metric. However they are still used, for example road distances, driving speeds and TV sizes.

Imperial units include inches, feet and yards.

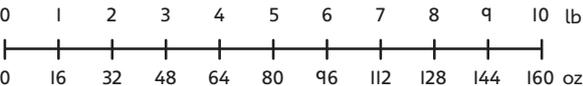


Metric conversion involves multiplying by 10, 100 and 1,000 which can be easier than converting between imperial units.

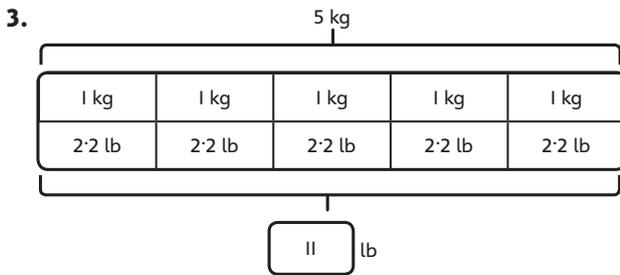
- 12 inches = 1 foot
- 1 yard = 3 feet
- 1 inch = 2.5 cm (roughly)

Lesson 6: Imperial units of mass

→ pages 126–128

1. 
- a) 3 lb = 48 oz e) 3 lb 3 oz = 51 oz
 b) 7 lb = 112 oz f) $\frac{1}{2}$ lb = 8 oz
 c) 5 lb = 80 oz g) $\frac{1}{4}$ lb = 4 oz
 d) 8 lb 2 oz = 130 oz h) 4.5 lb = 72 oz

2. a) 17 lb b) 17 lb = 272 oz



4. $3\frac{1}{2}$ lb is about 1.575 kg.
 Explanations may vary; for example:
 $3\frac{1}{2} \times 450 = 1,350 + 225 = 1,575$
 So, $3\frac{1}{2}$ lb is about 1,575 g, which is 1.575 kg.
5. a) Coloured measurements: T = 4,500 g, O = 4.5 kg, N = 160 oz
 b) The imperial unit is ton.
6. a) The giant octopus has a mass of 100 lb.
 b) 2.2 lb is about 1 kg, so 9.9 lb is about 4.5 kg. This means 100 lb is close to 45 kg.
 The giant octopus has a mass of approximately 45 kg.

Reflect

Methods may vary; for example:

- 1 lb = 2.2 kg (approximately)
- So: 14 lb = 14×2 kg + 14×0.2 kg = 30.8 kg (approximately)

Lesson 7: Imperial units of capacity

→ pages 129–131

1.

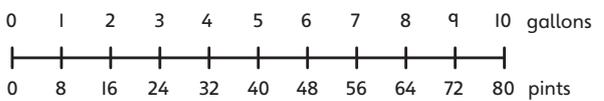
1 pt	2 pt	3 pt	4 pt	5 pt	6 pt	7 pt	8 pt
570 ml	1,140 ml	1,710 ml	2,280 ml	2,850 ml	3,420 ml	3,990 ml	4,560 ml

2. a) 5 pints = 2,850 ml e) 3 litres 420 ml = 6 pints
 b) 8 pints = 4,560 ml f) 7 pints = 3.99 litres
 c) 3 pints = 1,710 ml g) $\frac{1}{2}$ pint = 285 millilitres
 d) 1 litre 140 ml = 2 pints

3. Circled: $4\frac{1}{2}$ litres.

Explanations may vary; for example:

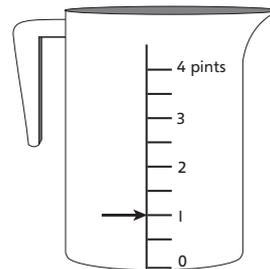
1 gallon = 8 pints = 4,560 ml = 4.56 l, which rounds to $4\frac{1}{2}$ litres to the nearest $\frac{1}{2}$ litre.

4. 

Pond C contains the most water.

5. The jug contains $3\frac{1}{2}$ pints = 1.995 litres approximately (accept close answer; for example: 2 litres)

6. Line drawn on jug at (or just over) 1 pint:



7. a) 1 gallon = 8 pints = 8×570 ml = 4.56 l (approximately)
 So, 1 gallon costs £5 at petrol station A but only £4.56 at petrol station B.
 Petrol station B is cheaper.
 b) She saves £4.40 ($10 \times £0.44$)

Reflect

1 pint is approximately 570 ml so 2 pints is about 1,140 ml. So, you could buy 1 litre if you don't need exactly 2 pints of milk. If you need at least 2 pints then you will need to buy 2 litres and you will have some left over.



Lesson 8: Converting units of time

→ pages 132–134

1. a)

310 minutes					
60 mins	60 mins	60 mins	60 mins	60 mins	10 mins

The rail journey is 5 hours 10 minutes.

b)

195 s			
60 s	60 s	60 s	15 s

The pop song is 3 minutes 15 seconds.

2. 2 hours 7 minutes = 127 minutes
 137 minutes = 2 hours 17 minutes
 Escape from Planet Zarg is longer.
3. No, Ambika is not correct. 0.25 of an hour is a quarter of an hour, which is $60 \text{ minutes} \div 4 = 15 \text{ minutes}$.
 So, 4.25 hours is 4 hours 15 minutes.
4. Bella, Lee, Mo, Kate

Name	Kate	Lee	Bella	Mo
Length of holidays	43 days	40 days	39 days	41 days

5. a) hours $\rightarrow \times 60 \rightarrow \times 60 \rightarrow$ seconds
 days $\rightarrow \times 24 \rightarrow \times 60 \rightarrow$ minutes
 days $\rightarrow \div 7 \rightarrow$ weeks
 b) leap year $\rightarrow \times 366 \rightarrow \times 24 \rightarrow \times 60 \rightarrow$ minutes

Reflect

30 months = 2 years and 6 months

Descriptions may vary; for example:

Divide 30 by 12 to give 2 years and leave the remainder (5) as months.

Lesson 9: Timetables

→ pages 135–137

1. a) There are 8 rows in the timetable. Each row shows a different stop.
 There are 6 columns. Each column shows a different coach.
 The times in the timetable are 24-hour times.
- b) It arrives at 08:45.
 c) It left at 12:50.
 d) At 14:15 Coach D arrives at Luton Airport. Its next stop is Hertford North Station. It takes 45 minutes to get there and it arrives at 15:00.
2. a) She is on the train for 40 minutes.
 b) He will wait 1 hour and 54 minutes.

c)

Grantham	13:15
Rauceby	–
Sleaford	13:41
Boston	14:09
Thorpe Culvert	14:31
Wainfleet	14:35
Havenhouse	14:39
Skegness	14:49

3.

	Bus 1	Bus 2
Hall Lane	07:40	14:48
Chapman Avenue	07:53	15:01
Wildshed Road	08:01	15:09
Station Road	08:10	15:18
Moorfield Academy	08:27	15:35

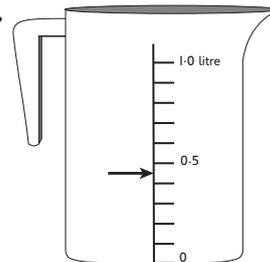
Reflect

Answers will vary but should include the fact that using 24-hour times makes it very clear if the time is in the morning or afternoon, which may be useful to avoid arriving at the wrong time.

Lesson 10: Problem solving – measure

→ pages 138–140

1. 2.7 kg is 2,700 grams.
 2. The frog has jumped 1.35 metres.
 3.



4. They have 160 grams each.
 5. $\pounds 1.50 = 90 \text{ cm}$
 $10 \text{ cm costs } \pounds 0.16$
 $100 \text{ cm} = 1 \text{ m} = \pounds 1.67$
 Shop A is cheaper
 6. $2.8 \text{ kg} = 2,800$
 $2,800 \text{ g} - 800 \text{ g} = 2,000 \text{ g}$
 $2,000 \text{ g} \div 5 = 400 \text{ g}$
 One football has a mass of 400 g.
 7. $1.25 \text{ m} = 125 \text{ cm}$
 $125 \text{ cm} - 80 \text{ cm} = 45 \text{ cm}$
 $45 \text{ cm} \div 3 = 15 \text{ cm}$
 The length of each space is 15 cm (or 0.15 m).



Reflect

Explanations may vary; for example:

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

$$2.5 \text{ cm} = 1 \text{ inch}$$

$$100 \div 2.5 = 40$$

So, she needs to measure 40 inches of string.

End of unit check

→ pages 141–142

My journal

1. a) 1.2 litres = 1,200 millilitres
I know this because there are 1,000 ml in 1 l.
To convert, multiply by 1,000.
- b) 490 minutes = 8 hours 10 minutes
I know this because there are 60 minutes in 1 hour.
To convert divide by 60 and write the remainder as minutes.
- c) 60 inches = 1.5 metres
There are 2.5 cm in 1 inch and 100 cm in 1 m.
To convert inches to centimetres multiply by 2.5
and then to convert cm to m divide by 100.

Power play

Look for children demonstrating fluency with 24 hour times, using timetables and adding or subtracting with time.