White Rose Maths

Summer - Block 4

Converting Units

Overview

Small Steps

1. Kilometres (R)
2. Kilograms and kilometres
3. Millimetres and millilitres
4. Metric units
5. Imperial units
6. Converting units of time
7. Timetables

Notes for 2020/21

Children have converted between metres and kilometres in year 4 and now build on this to look at other conversions. It is a good idea to recap the small step on kilometres to reinforce the idea of the prefix 'kilo-' meaning 'thousand'.

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Kilometres

Notes and Guidance

Children multiply and divide by 1,000 to convert between kilometres and metres.
They apply their understanding of adding and subtracting with four-digit numbers to find two lengths that add up to a whole number of kilometres.
Children find fractions of kilometres, using their Year 3 knowledge of finding fractions of amounts. Encourage children to use bar models to support their understanding.

Mathematical Talk

Can you research different athletic running races? What different distances are the races? Can you convert the distances from metres into kilometres? Which other sports have races over distances measured in metres or kilometres?
If 10 children ran 100 metres each, how far would they run altogether? Can we go outside and do this? How long do you think it will take to run 1 kilometre?
How can we calculate half a kilometre? Can you find other fractions of a kilometre?

Varied Fluency

R

Complete the statements.

3,000 m = ___ km

8 km = _____ m

5 km = ___ m

3 km + 6 km = _____ m

500 m = ___ km

250 m = _____ km

9,500 m = ___ km

4,500 m − 2,000 m = _____ km

Complete the bar models.

3 kilometres	
	1,800 metres

___ km	
2,870 m	4,130 m

Use <, > or = to make the statements correct.

500 m ◯ $\frac{1}{2}$ km

7 km ◯ 800 m

5 km ◯ 500 m

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Kilometres

Reasoning and Problem Solving

R

Dexter and Rosie walk 15 kilometres altogether for charity.
Rosie walks double the distance that Dexter walks.
How far does Dexter walk?

Rosie walks 10 km.

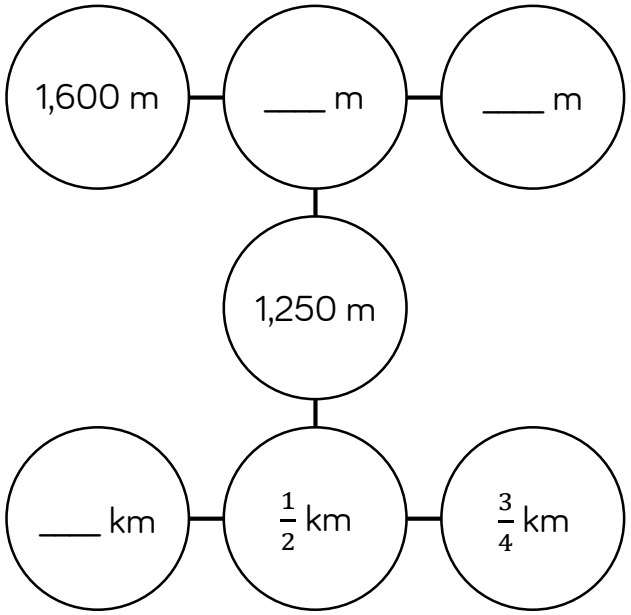
Dexter walks 5 km.

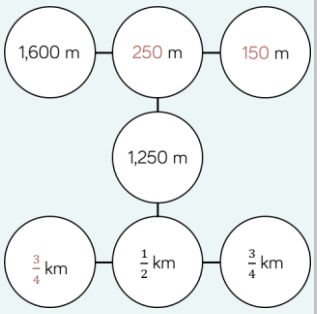
Dexter and Rosie each raise £1 for every 500 metres they walk.
How much money do they each make?

Rosie raises £20

Dexter raises £10

Complete the missing measurements so that each line of three gives a total distance of 2 km.





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Kilograms and Kilometres

Notes and Guidance

Children focus on the use of the prefix 'kilo' in units of length and mass, meaning a thousand. They convert from metres to kilometres (km), grams to kilograms (kg) and vice versa. It is useful for children to feel the weight of a kilogram and various other weights in order for them to have a better understanding of their value.

Bar Models or double number lines are useful for visualising the conversions.

Mathematical Talk

What does 'kilo' mean when used at the start of a word?

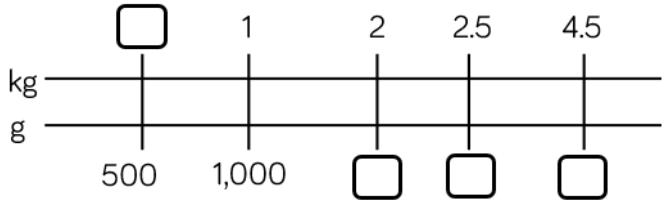
Complete the stem sentence:
There are _____ grams in ___ kilograms.

How would you convert a fraction of a kilometre to metres?

What is the same and what is different about converting from kg to g and km to m?

Varied Fluency

Find the missing values on the double number line.



Write your conversions as sentences.

Complete the missing information.

$\frac{1}{10}$ kilogram = ☐ grams $\frac{3}{10}$ km = ☐ metres

7 kg + $\frac{1}{4}$ kg = ☐ g 12 km + ☐ km = 12,500 m

Compare the measurements using <, > or =

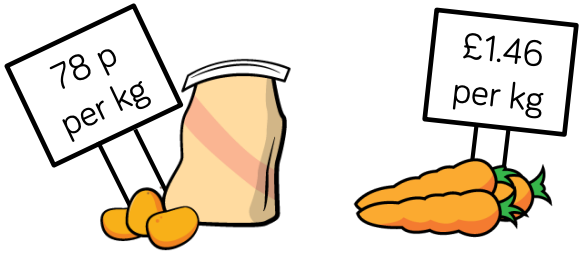
5 kg ◯ 4,500 g 12 kg ◯ 12,000 g

3.7 km ◯ 370 m 37,000 m ◯ 3.7 km

Kilograms and Kilometres

Reasoning and Problem Solving

Amir buys 2,500 grams of potatoes and 2,000 grams of carrots.



He pays with a £5 note.
How much change does he get?

Amir receives

13 p change.

Eva is converting measurements.
She says,

I have divided by 1,000 to convert the measurements.

Which conversions could Eva have completed?

- 3 km → 3,000 m
- 3,000 m → 3 km
- 5,500 g → 5.5 kg
- 2.8 kg → 2,800 g

Eva could have converted 3,000 m to 3 km or 5,500 g to 5.5 kg.

Milligrams and Millilitres

Notes and Guidance

Children focus on the use of milli- in units of length and mass.

They understand that milli- means $\frac{1}{1,000}$.

They convert from metres to millimetres (mm), litres to millilitres (ml) and vice versa.

Using rulers, metre sticks, jugs and bottles helps children to get a better understanding of the conversions.

Mathematical Talk

Can you complete the stem sentences to convert from millimetres to metres...

What does 'milli' mean when used at the start of a word?

Would it be appropriate to measure your height in millimetres?

Where have you seen litres before?

Varied Fluency

Complete the conversions.

1,000 mm = 1 m

5,000 mm = ☐ m

50,000 mm = ☐ m

500 mm = ☐ m

5,500 mm = ☐ m

1,000 ml = 1 l

☐ ml = 3 l

☐ ml = 30 l

300 ml = ☐ l

☐ ml = 0.3 l

Complete the missing information

$\frac{1}{1,000}$ m = ☐ mm $\frac{1}{100}$ m = ☐ mm $\frac{1}{10}$ m = ☐ mm

3 l + $\frac{1}{4}$ l = ☐ ml 2 l + ☐ ml = 2,500 ml

Compare the measurements using <, > or =

2 l ◯ 1,500 ml 60 l ◯ 6,000 ml

2.8 m ◯ 280 mm 3,700 m ◯ 3.7 mm

Milligrams and Millilitres

Reasoning and Problem Solving

Cola is sold in bottles and cans.

330 ml
48 p

1.25 litres
£1.59

Alex buys 5 cans and 3 bottles.
She sells the cola in 100 ml glasses.
She sells all the cola.
How many glasses does she sell?

Alex charges 50 p per glass.
How much profit does she make?

Alex sells 54 glasses.

Alex makes £19.83 profit.

Ribbon is sold in 225 mm pieces.
Teddy needs 5 metres of ribbon.
How many pieces does he need to buy?

Teddy would like to make either a bookmark or a rosette with his left over ribbon. Which can he make?

To make 5 bookmarks you will need:
1.2 metres of ribbon
1 pair of scissors

To make 1 mini rosette you will need:
4 pieces of ribbon cut to 35 mm
A stapler

Teddy buys 23 pieces of ribbon.

Teddy will have 175 mm left over.

A bookmark needs 240 mm, and a rosette needs 140 mm so he can make the rosette.

Metric Units

Notes and Guidance

Children convert between different units of length and choose the appropriate unit for measurement. They recap converting between millimetres, metres and kilometre to now include centimetres (cm).

Children see that they need to divide by different multiples of 10 to convert between the different measurements.

Mathematical Talk

What is the same and what is different about these conversions?

- Converting from cm to m
- Converting from m to cm

What does 'centi' mean when used at the start of a word?

Which unit of measure would be best to measure: the height of a door frame, the length of a room, the width of a book?

Varied Fluency

Measure the height of the piles of books in centimetres.

Find the difference between the tallest and shortest pile of books in millimetres.

Line A is 6 centimetres long.
Line B is 54 millimetres longer than line A.
Line C is $\frac{2}{3}$ of line B.
Draw lines A, B and C.

Here are the heights of 4 children.

Whitney	Jack	Rosie	Mo
1.3 m	124 cm	1.32 m	141 cm

Put the children in height order, starting with the shortest.
Write their heights in millimetres.

Metric Units

Reasoning and Problem Solving

A plank of wood is 5.8 metres long.

5.8 m

Two lengths are cut from the wood.

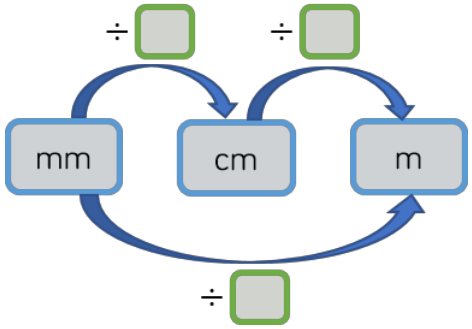
175 cm

$3\frac{4}{5}$ m

How much of the wood is left?

There is 25 cm left.

Complete the conversion diagram.



Can you make a diagram to show conversions from m and cm to mm?

÷ 10 ÷ 100

÷ 1,000

A 10 pence coin is 2 mm thick.

Eva makes a pile of 10 pence coins worth £1.30

What is the height of the pile of coins in centimetres?

The pile of coins is 2.6 cm tall.

Dora says,

One metre is 100 times bigger than one centimetre. One centimetre is 10 times bigger than one millimetre. So, one metre is 110 times bigger than one millimetre

Is Dora correct?

Explain your answer.

Dora is incorrect. She has added the number of times bigger together rather than multiplying.

One metre is 1,000 times bigger than one millimetre.

Imperial Units

Notes and Guidance

Children are introduced to imperial units of measure for the first time. They understand and use approximate equivalences between metric units and common imperial units such as inches, pounds (lbs) and pints.

Using the measurements in the classroom, such as with rulers, pint bottles, weights and so forth, helps children to get an understanding of the conversions.

1 kg is sometimes seen as approximating to 2.2 lbs.

Mathematical Talk

What do we still measure in inches? Pounds? Pints?

Why do you think we still use these imperial measures?

What does approximate mean?

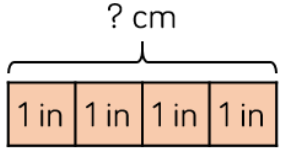
Why do we not use the equals (=) sign with approximations?

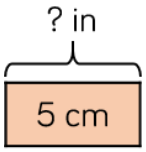
How precise should approximation be?

Varied Fluency

One inch is approximately 2.5 centimetres
1 inch ≈ 2.5 cm

Use the bar models to help with the conversions.





16in ≈ ☐ cm

15in ≈ ☐ cm

33in ≈ ☐ m

10cm ≈ ☐ in

1cm ≈ ☐ in

5.5m ≈ ☐ in

1 kilogram is approximately 2 pounds
1 kg ≈ 2 lbs

Use this information to complete the conversions.

2 kg ≈ ☐ lbs

☐ kg ≈ 22 lbs

5 kg ≈ ☐ lbs

55 kg ≈ ☐ lbs

There are 568 millilitres in a pint.

How many litres are there in:

2 pints | 5 pints | 0.5 pints | 2.5 pints

Imperial Units

Reasoning and Problem Solving

Jack's house has 3 pints of milk delivered 4 times a week.
How many litres of milk does Jack have delivered each week?

He uses about 200 ml of milk every day in his cereal. Approximately, how many pints of milk does Jack use for his cereal in a week?

12 pints is approximately 6,816 millilitres, or 6.8 litres.

200 × 7 = 1,400 ml

1400 ÷ 568 = 2.46 pints

So Jack uses approximately 2 and a half pints.

- Dora weighed 7.8 lbs when she was born.
- Amir weighed 3.5 kg when he was born.

Who was heavier, Dora or Amir?
Explain your answer.

Children convert both measures to the same unit.

Dora weighed approximately 3.9 kg and Amir weighed 3.5 kg so Dora was heavier.

Converting Units of Time

Notes and Guidance

Children convert between different units of time including years, months, weeks, days, hours, minutes and seconds.
Bar modelling will support these conversions.
Use of time lines, calendars, clocks is recommended to enhance pupils' understanding.
It is worth reminding pupils that time is not decimal so some methods may not be effective for conversions.

Mathematical Talk

How many months / weeks / days are there in a year?

How many hours / minutes / seconds are there in a day?

Can 21 days be written in weeks? Can 25 days be written in weeks? Explain your answers.

Is 0.75 hours the same as 75 minutes? Why or why not?

Varied Fluency

Complete the conversions.

1 year = ☐ months ☐ years = 24 months

☐ years = 60 months 2.5 years = ☐ months

3 years 2 months = ☐ months

☐ years ☐ months = 75 months

Complete the table.

Days	Weeks / Weeks and Days
42 days	
	5 weeks and 5 days
	10 weeks and 5 days
100 days	

Use this information to complete the conversions.

$\frac{1}{3}$ hour = ☐ minutes

3 ☐ and 24 ☐ = 204 ☐

1.5 minutes = ☐ seconds

1.05 minutes = ☐ seconds

Converting Units of Time

Reasoning and Problem Solving

Teddy's birthday is in March.
Amir's birthday is in April.
Amir is 96 hours older than Teddy.
What dates could Teddy and Amir's birthdays be?

28th March and 1st April

29th March and 2nd April

30th March and 3rd April

31st March and 4th April

Three children are running a race.

- Whitney finishes the race in 3 minutes 5 seconds.

- Eva finishes the race in 192 seconds.

- Alex finishes the race in 2 minutes and 82 seconds.

Who finishes the race first?

Whitney: 3 min 5 s

Eva: 3 min 12 s

Alex: 3 min 22 s

Whitney finishes the race first.

Timetables

Notes and Guidance

Children use timetables to retrieve information. They convert between different units of time in order to solve problems using the timetables.
Children will be tempted to use the column method to find the difference between times. Time lines are a more efficient method since time is not decimal.
Children create their own timetables based on start and end times of their day.

Mathematical Talk

When do we use timetables in every day life?

How do we know where the important information is on the timetable?

When does column method not work for finding the difference between times?

Varied Fluency

Use the timetable to answer the questions.

Bus Timetable					
Halifax Bus Station	06:05	06:35	07:10	07:43	08:15
Shelf Roundabout	06:15	06:45		07:59	08:31
Shelf Village Hall	06:16	06:46	07:35	08:00	08:32
Woodside	06:21	06:50	07:28		
Odsal	06:26	06:55	07:33	08:15	08:45
Bradford Interchange	06:40	07:10	07:48	08:30	09:00

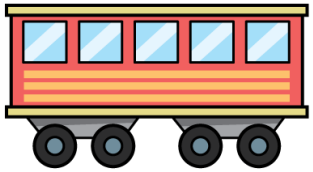
Is the time to get from Shelf Roundabout to Bradford Interchange the same for every bus?
Why might the time not always be the same?
Why are some of the times blank?

There are five TV programmes on between 17:00 and 23:00
The News starts at 6 p.m. and lasts for 45 minutes.
Mindless is on for 1 hour and ends at 18:00.
Junk Collectors is on for 75 minutes and starts straight after The News.
Catch Up is on for 300 seconds and starts at 20:00
The Thirsty Games is on for 175 minutes and ends at 23:00
Make a timetable for the evening TV.

Timetables

Reasoning and Problem Solving

Three trains travel from Halifax to Leeds on the same morning: the express train, the slow train and the cargo train.



The express train leaves Halifax 10 minutes after the slow train, but arrives at Leeds 10 minutes before it.
The slow train takes 50 minutes to reach Leeds and arrives at 10:33
The cargo train leaves 20 minutes before the slow train and arrives at Leeds 39 minutes after the Express.

What time does each train leave Halifax and what time does each train arrive at Leeds Station?

The slow train leaves Halifax at 9:43 and arrives in Leeds at 10:33

The express train leaves Halifax at 9:53 and arrives in Leeds at 10:23

Goods train leaves Halifax at 9:23 and arrives in Leeds at 11:02

Make a timetable of your school day.

Calculate how many hours each week you spend on each subject.
Can you convert this into minutes?
Can you convert this into seconds?

If this is an average week, how many hours a year do you spend on each subject?
Can you convert the time into days?

Answers will vary depending on the school day.