

# Reasoning and Problem Solving

## Step 3: Metric Units

### National Curriculum Objectives:

Mathematics Year 5: (5M5) [Convert between different units of metric measure \(for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre\)](#)

### Differentiation:

Questions 1, 4 and 7 (Problem Solving)

**Developing** Use the given clues to calculate the amount of space used/needed (multiples of 10 only).

**Expected** Use the given clues to calculate the amount of space used/needed (any numbers, including some use of fractions).

**Greater Depth** Use the given clues to calculate the amount of space used/needed (any numbers, including the use of fractions).

Questions 2, 5 and 8 (Reasoning)

**Developing** Find, correct and explain any mistakes in the conversion table from metres to millimetres (direct conversions only, 3 rows).

**Expected** Find, correct and explain any mistakes in the conversion table from metres to millimetres (3 columns, 3 rows).

**Greater Depth** Find, correct and explain any mistakes in the conversion table from metres to millimetres (3 columns, 5 rows).

Questions 3, 6 and 9 (Reasoning)

**Developing** Given two statements about converting metric units, decide which is correct and why.

**Expected** Given two statements about converting metric units, decide which is correct and why.

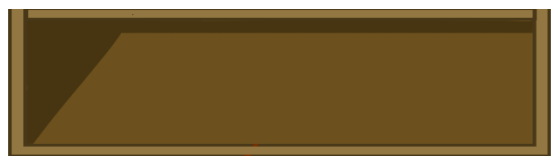
**Greater Depth** Given two statements about converting metric units, decide which is correct and why.

More [Year 5 Converting Units](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

## Metric Units

1a. Finn needs to fit seven 10cm books into his bookcase.



0.8m

Will the books fit?  
How many cm are spare/needed?



PS

## Metric Units

1b. Cecilia needs to fit nine 5cm packages into her storage box.



40cm

Will the packages fit?  
How many cm are spare/needed?



PS

2a. Sufya is converting cm to m in the table below.

cm	m
50	0.5
110	11
360	3.6

Explain and correct her mistakes.



R

2b. Jensen is converting cm to mm in the table below.

cm	mm
120	12
210	2,100
950	9,500

Explain and correct his mistakes.



R

3a. Gloria and Andy are converting millimetres to centimetres.



Gloria

One centimetre is 10 times bigger than one millimetre.

One centimetre is 100 times bigger than one millimetre.



Andy

Who is correct? Prove it.



R

3b. Cole and Albany are converting centimetres to metres.



Cole

One metre is 100 times bigger than one centimetre.

One metre is 10 times bigger than one centimetre.



Albany

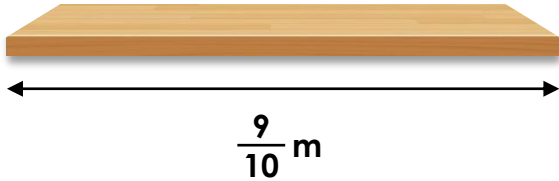
Who is correct? Prove it.



R

## Metric Units

4a. Holly needs to fit seven 12cm boxes on this shelf.



Will the boxes fit?  
How many cm are spare/needed?



PS

## Metric Units

4b. Johnny wants to hang eight picture frames on his 2.1m wall.



Will the picture frames fit?  
How many m are spare/needed?



PS

5a. Amelia is converting millimetres to centimetres and metres using the table below.

mm	cm	m
700	70	7
4,600	460	4.6
8,100	81	8.1

Explain and correct her mistakes.



R

5b. Ricardo is converting metres to centimetres and millimetres using the table below.


m	cm	mm
0.9	9	900
1.3	130	13,000
5.08	50.8	5,080

Explain and correct his mistakes.




R

6a. Shaun and Sarah are converting millimetres to metres.



Shaun

'Milli' in millimetres means 1,000 so it is easy to remember how many millimetres are in one metre.



Sarah


'Milli' in millimetres means 100 so it is easy to remember how many millimetres are in one metre.

Who is correct? Why?




R

6b. Cassie and Anthony are converting centimetres to metres.



Cassie

'Centi' in centimetres means 100 so it is easy to remember how many centimetres are in one metre.



Anthony

'Centi' in centimetres means 10 so it is easy to remember how many centimetres are in one metre.

Who is correct? Why?



R

## Metric Units

7a. Mason wants to fit eight 3.2cm books and six 0.9cm magazines on his windowsill.



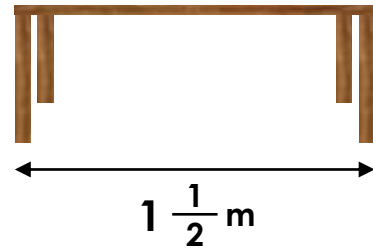
Will the books and magazines fit?  
How many cm are spare/needed?



PS

## Metric Units

7b. Moira wants to fit four 31.5cm placemats and three 7.5cm coasters in a row on her table.



Will the placemats and coasters fit?  
How many cm are spare/needed?



PS

8a. Garrett is converting millimetres to centimetres and metres using the table below.

mm	cm	m
506	5.06	0.506
901	90.1	9.01
1,060	106	10.6
5,034	503.4	5.034
9,010	901	90.1

Explain and correct his mistakes.



R

8b. Karla is converting metres to centimetres and millimetres using the table below.

m	cm	mm
10	10,000	10,000
8.02	802	8,020
6.04	60.4	6,040
0.21	21	2,100
0.01	1	100

Explain and correct her mistakes.



R

9a. Miley and Billy are converting millimetres to metres.



Miley

I need to multiply my millimetres by 1,000 to convert them to metres.

I need to divide my millimetres by 1,000 to convert them to metres.



Billy

Who is correct? Why?



R

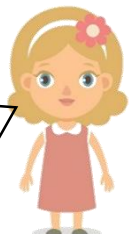
9b. Orion and Ingrid are converting metres to millimetres.



Orion

I can multiply my metres by 100 and then by 10 to convert to millimetres.

I can divide my metres by 100 and then by 10 to convert to millimetres.



Ingrid

Who is correct? Prove it.



R

## Reasoning and Problem Solving Metric Units

### Developing

1a. **Yes – 10cm spare**

2a.

50	0.5
110	1.1
360	3.6

Divided by 10 instead of 100.

3a. **Gloria is correct.  $1\text{mm} \times 10 = 10\text{mm} = 1\text{cm}$**

### Expected

4a. **Yes – 6cm spare**

5a.

700	70	0.7
4,600	460	4.6
8,100	810	8.1

Divided by 10 instead of 100

Divided by 100 instead of 10

6a. **Shaun is correct.  $1,000\text{mm} = 1\text{m}$ .  $100\text{mm} = 0.1\text{m}$**

### Greater Depth

7a. **No. 1cm needed**

8a.

506	50.6	0.506
901	90.1	0.901
1,060	106	1.06
5,034	503.4	5.034
9,010	901	9.01

Divided by 100 instead of 10

Divided by 10 instead of 100

Divided by 10 instead of 100

Divided by 10 instead of 100

9a. **Billy is correct because a metre is 1,000mm. For example; if you converted 1,000mm into m by dividing by 1,000 it would equal 1m whereas multiplying would equal 100,000m, which cannot be correct as  $1\text{m} = 1,000\text{mm}$ .**

## Reasoning and Problem Solving Metric Units

### Developing

1b. **No – 5cm needed**

2b.

120	1,200
210	2,100
950	9,500

Divided by 10 instead of multiplying by 10.

3b. **Cole is correct.  $1\text{cm} \times 100 = 100\text{cm} = 1\text{m}$**

### Expected

4b. **Yes – 0.1m spare**

5b.

0.9	90	900
1.3	130	1,300
5.08	508	5,080

Multiplied by 10 instead of 100

Multiplied by 100 instead of 10

Multiplied by 10 instead of 100

6b. **Cassie is correct.  $100\text{cm} = 1\text{m}$ .  $10\text{cm} = 0.1\text{m}$**

### Greater Depth

7b. **Yes. 1.5cm spare**

8b.

10	1,000	10,000
8.02	802	8,020
6.04	604	6,040
0.21	21	210
0.01	1	10

Multiplied by 1,000 instead of 100

Multiplied by 10 instead of 100

Multiplied by 100 instead of 10

Multiplied by 100 instead of 10

9b. **Orion is correct. You could convert metres to millimetres in two steps. For example; if you had 8.32m it would equal 832cm which in turn equals 8,320mm (multiplying by 100 to convert to cm then 10 to convert to mm).**