# Reasoning and Problem Solving
# Step 3: Calculate with Metric Measures

## National Curriculum Objectives:

**Mathematics Year 6: (6M5)** Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
**Mathematics Year 6: (6M9)** Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

## Differentiation:

**Questions 1, 4 and 7 (Problem Solving)**
**Developing** Solve a word problem using numbers with up to 1 decimal place.
**Expected** Solve a word problem using numbers with up to 3 decimal places, sometimes including 1 zero as a place holder, and including halves and quarters as fractions.
**Greater Depth** Solve a word problem using numbers with up to 3 decimal places, using a number of zeros as place holders, and including any fractions and percentages.

**Questions 2, 5 and 8 (Problem Solving)**
**Developing** Make a statement true by arranging digit cards using numbers with up to 1 decimal place. All digit cards required.
**Expected** Make a statement true by arranging digit cards using numbers with up to 3 decimal places, sometimes including 1 zero as a place holder. All digit cards required.
**Greater Depth** Make a statement true by arranging digit cards using numbers with up to 3 decimal places, using a number of zeros as place holders. Not all digit cards required.

**Questions 3, 6 and 9 (Reasoning)**
**Developing** Explain if a statement is correct using numbers with up to 1 decimal place.
**Expected** Explain if a statement is correct using numbers with up to 3 decimal places, sometimes including 1 zero as a place holder, and including halves and quarters as fractions.
**Greater Depth** Explain if a statement is correct using numbers with up to 3 decimal places, using a number of zeros as place holders, and including any fractions and percentages.

## More Year 6 Converting Units resources.

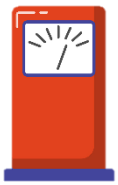
## Did you like this resource? Don't forget to review it on our website.

# Calculate with Metric Measures

1a. The sign in the petrol station reads:

**Petrol: £1 per 1.83L**

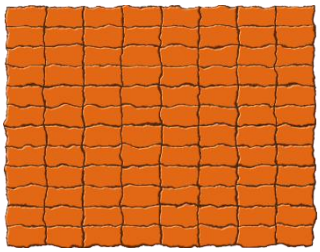
**Diesel: £1 for 1,650ml**



Which fuel is the most expensive?

D PS

1b. A brick is 30cm in length. The length of the wall is 6m long.



How many bricks are there in one layer of the wall?

D PS

2a. Stacey and Danny do the long jump. Danny jumps the furthest. Arrange the digit cards to make the following statement true.

? 8 ? cm > 0 . ? m

8 4 9

D PS

2b. Bags of charcoal weigh less than a frozen turkey. Arrange the digit cards to make the following statement true.

0 . ? kg < ? 6 ? g

8 0 7

D PS

3a. The lift can hold up to 500kg. An average person weighs 70kg. Marcus says,

Eight people can get in the lift together.

Is he correct? Explain your answer.

D R

3b. Twelve 1 litre bottles of water are delivered. It takes 6,250ml to fill the tank. Libby says,

I will have 6 litres of water left.

Is she correct? Explain your answer.

D R

# Calculate with Metric Measures

4a. A fish tank needs 3.75 litres of water to fill it. The tank has to be filled using a jug that holds $\frac{3}{4}$ litres.

How many jugs will it take to fill the tank?

E PS

# Calculate with Metric Measures

4b. Ten strips of wood are three different lengths. There is a gap in the fence that is 360cm.

Strip A = 45 cm

Strip B = 0.75m

Strip C = $1\frac{1}{2}$ metres

How many of each strip of wood will fit into the gap?

E PS

5a. The weight of a shopping bag is heavier than a bag of potatoes. Arrange the digit cards to make the following statement true.

| 0 | . | ? | kg | > | ? | 0 | ? | g |
|---|---|---|---|---|---|---|---|---|

| 7 | 0 | 5 |
|---|---|---|

E PS

5b. A watering can holds more water than a pan. Arrange the digit cards to make the following statement true.

| ? | . | 5 | L | > | ? | 5 | 0 | ml |
|---|---|---|---|---|---|---|---|---|

| 5 | 4 | 7 |
|---|---|---|

E PS

6a. A piece a ribbon wrapped around a jar measures 10cm. Diana buys a length of ribbon and says,

This length is 2.75m and will be long enough to do 30 jars.

Is she correct? Explain your answer.

E R

6b. An orange weighs 12g. Filipo weighs two bags of oranges and says,

Together, two bags of oranges weigh 0.204kg. I must have 18 oranges.

Is he correct? Explain your answer.

E R

## Calculate with Metric Measures

7a. A new pair of curtains measures 2.08m. The length from the curtain rail to the floor is $\frac{1}{8}$ metre longer than the curtains.

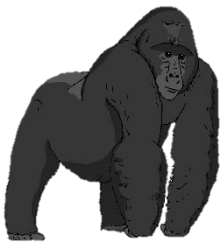
How many more metres of material did they need to get?

GD

PS

## Calculate with Metric Measures

7b. The lion weighs 200kg.
The gorilla is 80% of the weight of a lion.



How heavy is the gorilla in kg?

GD

PS

8a. Jayne has 3.85 litres of lemonade. Dom has 40% more than her. Show his measurement compared to Jayne's using the digit cards.

5 ? ? 0 ml > ? . 8 ? L

3 9 5

GD

PS

8b. The length of the football pitch is approximately 120m and is 5 times the length of a cricket pitch. Show the two lengths using the digit cards.

? . ? 2 km > ? . 0 ? ? km

0 1 2 4

GD

PS

9a. Each child brings in a tin of food for the Harvest festival. A tin weighs 0.405kg. There are 45 children in the class. Jacob says,

The basket holds up to 20kg so will be able to hold all the tins.

Is he correct? Explain your answer.

GD

R

9b. Genevieve has 6 litres of milk but only needs 2,250ml.
She says,

We can have $\frac{5}{8}$ of the milk for our breakfast tomorrow.

Is she correct? Explain your answer.

GD

R

## Reasoning and Problem Solving
## Calculate with Metric Measures

### Developing

1a. Diesel

2a. 984cm > 0.8m; 889cm > 0.4m; 988cm > 0.4m

3a. Marcus is incorrect, because 8 x 70kg is greater than 500kg (560kg).

### Expected

4a. 5 jugs

5a. 0.7 kg > 500g

6a. Diana is incorrect because the length needed for 30 jars is 30 x 10cm = 300cm or 3m

### Greater Depth

7a. 0.125m

8a. 5,390ml > 3.85L

9a. Yes, Jacob is correct because 45 x 0.405 = 18.225kg, which is less than 20kg.

## Reasoning and Problem Solving
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### Developing

1b. 20

2b. 0.7kg < 860g

3b. Libby is incorrect, because 12 litres – 6,250ml is less than 6 litres (5.75L).

### Expected

4b. Three possible answers: 3 x Strip A, 1 x Strip B and 1 x Strip C; or 8 x Strip A; or 3 x Strip A and 3 x Strip B

5b. 4.5L > 750 ml; 4.5L > 550ml; 5.5L > 450ml; 7.5L > 450ml; 7.5L > 550ml

6b. Filipo is incorrect because the weight of 18 oranges is 18 x 12g = 216g (0.216kg)

### Greater Depth

7b. 160kg

8b. 0.12km > 0.024km

9b. Yes, Liz is correct because there will be 3,750ml left which is $\frac{5}{8}$ of 6 litres.