

Reasoning and Problem Solving

Step 1: Metric Measures

National Curriculum Objectives:

Mathematics Year 6: (6M6) [Convert between miles and kilometres](#)

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](#)

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 up to three decimal places](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Assign a unit of measurement to two given values within a given context and explain choices. Measures of length, mass, volume or time using whole numbers.

Expected Assign a unit of measurement to three given values within a given context and explain choices. Measures of length, mass, volume or time using whole numbers and some decimals.

Greater Depth Assign a unit of measurement to three given values of more than one measurement within a given context and explain choices. Measures of length, mass, volume or time using whole numbers and decimals.

Questions 2, 5 and 8 (Reasoning)

Developing Explain which statement is the best estimation in a given measuring context. Measures of length, mass, volume or time using whole numbers.

Expected Explain which statement is the best estimation in a given measuring context. Measures of length, mass, volume or time using whole numbers and some decimals.

Greater Depth Explain which statement is the best estimation in a given measuring context when measuring more than one item. Measures of length, mass, volume or time using whole numbers and decimals.

Questions 3, 6 and 9 (Problem Solving)

Developing Using a given measurement, make other estimated measurements. Measures of length, mass, volume or time using whole numbers.

Expected Using a given measurement, make other estimated measurements. Measures of length, mass, volume or time using whole numbers and some decimals.

Greater Depth Using a given measurement, make other estimated measurements, including measurements of more than one item. Measures of length, mass, volume or time using whole numbers and decimals.

More [Year 5 and Year 6 Converting Units](#) resources.

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Metric Measures

1a. Millie is measuring how long it takes her friends to run around the playground.

Hafsa	2	<input type="text"/>
Luke	180	<input type="text"/>

She has forgotten to write the unit of measurement.

Which unit measurement could she be using for each time? Convince me.



6 R

Metric Measures

1b. Joseph is measuring the length of his classmates' pencil cases and recording his results.

Jack	30	<input type="text"/>
Lucy	400	<input type="text"/>

He has forgotten to write the unit of measurement.

Which unit measurement could he be using for each weight? Convince me.



6 R

2a. The children are estimating how much water is needed to fill a paddling pool.



Tracy

I think it will be around 30ml.

I think it will be around 30l.



Jaxon

Who do you agree with and why?



6 R

2b. The children are estimating how long it will take to walk three times around the playground .



Ethan

I think it will be around 2 seconds.

I think it will be around 2 minutes.



Isobel

Who do you agree with and why?



6 PS

3a. If we know that one pencil is 20cm long, make estimates for the following:

a table leg	
a pencil case	
a water bottle	
a rubber	



6 PS

3b. If we know that a tennis ball weighs 60g, make estimates for the following:

a football	
a golf ball	
a bouncy ball	
a cricket ball	



6 R

Metric Measures

4a. Terrie is measuring the length of her classmates' arms and recording her results.

Jenny	0.3	<input type="text"/>
Gerry	400	<input type="text"/>
Jonah	38	<input type="text"/>

She has forgotten to write the unit of measurement.

Which unit measurement could she be using for each length? Convince me.



6 R

Metric Measures

4b. Max is measuring the volume of his classmates' water bottles and recording his results.

Iqra	500	<input type="text"/>
Will	0.8	<input type="text"/>
Jake	1	<input type="text"/>

He has forgotten to write the unit of measurement.

Which unit measurement could he be using for each volume? Convince me.



6 R

5a. The children are estimating how much water is needed to fill a bath.



Susie

I think it will be around 80ml.

I think it will be around 80l.



Jojo

Who do you agree with and why?



6 R

5b. The children are estimating how heavy the desk is.



Jaiden

I think it will be around 25kg.

I think it will be around 25g.



Isaac

Who do you agree with and why?



6 PS

6a. If we know that one apple weighs 75g, make estimates for the following:

a grape	<input type="text"/>
a pineapple	<input type="text"/>
a watermelon	<input type="text"/>
an orange	<input type="text"/>



6 PS

6b. If we know that a cat is approximately 50cm long, make estimates for the following:

a cow	<input type="text"/>
a mouse	<input type="text"/>
a pig	<input type="text"/>
a sheep	<input type="text"/>



6 R

Metric Measures

7a. Robyn is measuring how high her friends' can jump.

Ellie 2.5
Martha cm
Jake m

What unit of measurement is missing?

Estimate the missing measurements.



6 R

Metric Measures

7b. Erin is measuring the weight of her friends' lunch boxes.

Connor 0.5
Bradley kg
Alex g

What unit of measurement is missing?

Estimate the missing measurements.



6 R

8a. The children are estimating the time it will take to arrive at the museum, 10 miles away.



Safeyah

I think it will take around three quarters of an hour.

I think it will take around 1000 seconds.



Pippa

Who do you agree with and why?



6 R

8b. The children are estimating the length of the playground.



Felix

I think it will be around a tenth of a kilometre.

I think it will be around 100m.



Yusuf

Who do you agree with and why?



6 PS

9a. If we know that the height of a door is 2m, make estimates for the following:

2 pens	
a chair	
a teacher	
2 water bottles	



6 PS

9b. If we know that it takes Freddie 2 minutes 30 seconds to walk around the field, make estimates for the following:

running twice	
hopping	
skipping	
dribbling a ball	



6 R

Reasoning and Problem Solving

Metric Measures

Developing

1a. 2 minutes, 180 seconds. Each is around the same time and children would take a similar time to complete the activity.

2a. Jaxon is correct as litres is a greater measure of volume than millilitres.

3a. Estimates may vary: table leg – 1m, pencil case – 30cm, water bottle – 50cm, rubber – 5cm

Expected

4a. 0.3m, 400mm, 38cm.

Each is around the same length if the units differ, and children in one class would have similar length arms.

5a. Jojo is correct as a bath would need more water to fill it and litres is a greater measure than millilitres.

6a. Estimates may vary: grape – 5g, pineapple – 1kg, watermelon – 8kg, orange – 100g

Greater Depth

7a. 2.5m. Estimates may vary: Martha – 300cm, Jake – 2.75m

8a. Safeeyah is correct as it will take much longer than 1000 seconds to travel 10 miles.

9a. Estimates may vary: 2 pens – 40cm, chair – 0.5m, teacher – 1.5m, 2 water bottles – 60cm

Reasoning and Problem Solving

Metric Measures

Developing

1b. 30cm, 400mm. Each is around the same length and pencil cases would be of similar lengths.

2b. Isobel is correct as minutes is a greater measure of time than seconds.

3b. Estimates may vary: football – 400g, golf ball – 50g, bouncy ball – 10g, cricket ball – 160g

Expected

4b. 500ml, 0.8 litres, 1 litre. Each is around the same volume if the units differ, children will have similar sized water bottles.

5b. Jaiden is correct as the weight of a table would be measured in kg rather than grams.

6b. Estimates may vary: cow – 2m, mouse – 15cm, pig – 1.5m, sheep – 1m

Greater Depth

7b. 0.5kg. Estimates may vary: Bradley – 0.8kg, Alex – 750g.

8b. Both are correct as 0.1km and 100m are the same distance.

9b. Estimates may vary: running twice – 1 minute 30 seconds, hopping – 4 minutes, skipping – 2 minutes, dribbling a ball – 2 minutes.