

MATHEMATICS

6

SAMPLE RESPONSES



Walk the line

This booklet is designed to help teachers make overall, on-balance judgments by providing examples of student responses. The responses are not an exhaustive set.

C samples

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Overall grade

The purpose of this QCAT is for students to use non-standard units of measure to estimate distances and to solve related mathematical problems. This response typically demonstrates a sound level of communication, understanding and application of the use of non-standard units of measure to estimate distances and solve multi-step problems. On balance, this work is an overall C.

Guide to making judgments — Year 6 Mathematics	Student
<p>Purpose: To use non-standard units of measure to estimate distances and to solve related mathematical problems.</p>	

Knowledge and understanding	Thinking and reasoning	Communicating
<p>Uses non-standard units to measure.</p> <p>Uses standard units to measure and calculate lengths and times.</p> <p>Q 1, 2a, 2b, 4</p>	<p>Explains procedures and strategies used in making predictions, estimations and solving problems.</p> <p>Q 2c, 3, 5, 6</p>	<p>Uses mathematical language to communicate and justify thinking and reasoning.</p> <p>Q 1b, 2c, 3, 5d, 6</p>
<p>Personal measurements, calculations and mud map tables are correctly completed. Step length calculations are correct and clear.</p> <p>Correctly calculates estimates of object length.</p>	<p>All predictions, estimated lengths, distances and directions are reasonable. Explanations are clear, showing an understanding of reasoning and error. Solves multi-step problems with explanation of thinking.</p> <p>Solves multi-step problems.</p>	<p>Clearly and consistently communicates and justifies thinking and reasoning using mathematical language, diagrams and correct units where necessary.</p> <p>Explanations and working are logical and well-reasoned.</p>
<p>Personal measurements, calculations and mud map tables are completed — entries are correct.</p>	<p>Measurements in non-standard units and estimates are mostly reasonable and correct.</p>	<p>Working and correct units are present in most solutions. Explanations and working are mostly clear.</p>
<p>Communicates satisfactory understanding of non-standard units to estimate distances, by completing the step length (Q 1), and the distance</p>	<p>Thinking and reasoning</p> <p>Number of steps taken for estimates shows some variation to what should be expected.</p> <p>Explanation demonstrates some understanding of variation when using non-standard units. Correctly</p>	<p>Communicating</p> <p>Uses appropriate working and units in most answers.</p> <p>Explanations are brief.</p>
<p>Communicates satisfactory understanding of non-standard units to estimate distances, by completing the step length (Q 1), and the distance</p>		<p>Communicating</p> <p>Uses appropriate working and units in most answers.</p> <p>Explanations are brief.</p>

Communicating
Uses appropriate working and units in most answers. Explanations are brief.



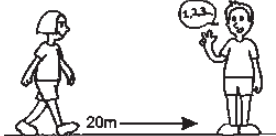
Thinking and reasoning
Number of steps taken for estimates shows some variation to what should be expected.
Explanation demonstrates some understanding of variation when using non-standard units. Correctly predicts and solves multi-step problem based on own and teacher's step length. Does not investigate thoroughly the distance to school, and solution contains a conversion error.

Knowledge and understanding
Demonstrates satisfactory knowledge and understanding of the use of non-standard units of measure to estimate distances, by correctly completing the step length calculation (Q 1), and the distance walked in steps and time columns for the mud map table (Q 4). The large range in values for the estimate of object length implies the personal measurements table (Q 2a) contains some cells that are inaccurate

C Sample: Response 1

Recording personal measurements

- 1 a) Complete the table below to find three personal measurements.
Use a ruler and round your measurements to the nearest centimetre.

Non-standard unit	Personal measurement
 Hand span	My hand span is: 19..... cm
 Shoe length	My shoe length is: 29..... cm
 Number of steps taken to walk 20 metres. (Use the track marked out by your teacher for this.)	The number of steps I took is: 28..... steps

- 1 b) Find the length of one of your steps in centimetres.



- Divide the distance you walked (in centimetres) by the number of steps you took.
- Round your answer to the nearest centimetre.

Show all your working

$$20\text{ m} = 2000\text{ cm}$$

$$2000\text{ cm} \div 28 = 71\text{ cm}$$

One of my step lengths is about71..... centimetres

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

C Sample: Response 1

Now that you have recorded three personal measurements, you will use them to estimate other lengths.

Your teacher will provide an object for you to measure.

- 2 a) Measure the length of the object using your non-standard units. Record them in the table below.

Name of object: Blackboard

Non-standard unit	Number	Personal measurement (from page 4)
My hand span	<u>11</u> hand spans	<u>19</u> cm
My shoe length	<u>8</u> shoe lengths	<u>29</u> cm
My step length	<u>6</u> step lengths	<u>71</u> cm

- 2 b) Estimate the length of the object by converting your measurements of the object into centimetres.

My calculation of the length of the object:

- using my hand span is 209 cm
- using my shoe length is 232 cm
- using my step length is 426 cm

C Sample: Response 1

2 c) Complete the statements below.

My estimates of the object may not be all the same because they are
all different lengths and I'm
timing them by different numbers

I predict the non-standard unit that would give the most accurate estimate over this distance is:

shoe length
because it was closest to the mat
because the number of shoe lengths
it took me to fill in the 3m

C Sample: Response 1

Write your teacher's step length here: 70 cm

Suppose you and your teacher walked 1000 metres together.

3 a) Who would take the most steps? my teacher

3 b) How many more steps would that person take? 20 steps

Explain how you worked this out.

Show all working.

$$\begin{array}{r} 71 \overline{) 100000} \text{ me} \\ \underline{6} = 1408 \text{ steps} \end{array}$$

$$\begin{array}{r} 70 \overline{) 100000} \text{ My teacher} \\ \underline{6} = 1428 \text{ steps} \end{array}$$

$$\begin{array}{r} 1428 \\ - 1408 \\ \hline 0020 \rightarrow 20 \text{ steps} \end{array}$$

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

C Sample: Response 1

4. Complete the table below using information from page 8.

Section	Distance walked in section (steps)	Distance walked in section (metres)	Time arrived at end of section	Time taken for section (minutes)
1. school front gate to corner Danzig Rd & Bridge Rd	1450	240	3:29 pm	14
2. corner of Danzig Rd to western end of the bridge	500	80	3:37 pm	8
3. western to the eastern end of the bridge	200	30	3:41 pm	4
4. eastern end of the bridge to corner Park St & Church Ave	450	270	3:45 pm	4
5. corner of Park St to corner Church Ave & View St	1150	191	4:01 pm	16
6. corner of Church Ave to home	1000	160	4:09 pm	8

5 a) Circle the section that is the shortest distance: 1 2 3 4 5 6

5 b) How long did it take Jack to walk home? 54 mins

5 c) How far does Jack walk home in metres? 971 m

5 d) Where is Jack when he has walked half the distance home? Circle your answer below.

On Danzig Rd

On Bridge Rd

On the bridge

On Park St

On Church Ave

Explain how you worked this out.

$$4750 \div 2 = 2375$$

C Sample: Response 1

- 6 a) Work out the distance (in metres) between the school gate and Jack's home along the new road.

Show all your working.

$$\begin{array}{r} 700 \text{ steps} \\ + 1150 \text{ steps} \\ \hline 1850 \text{ steps} \\ \hline = 308 \text{m} \end{array}$$

- 6 b) State the direction of the school from Jack's house. West



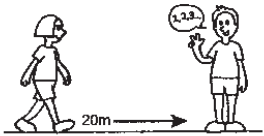
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This response demonstrates a high level of application of effective strategies to solve mathematical problems, and sound communication of ideas, despite the limited understanding of the use of non-standard units of measure to estimate distances. Considering the purpose of the task, on balance, this work is an overall C.

C Sample: Response 2

Recording personal measurements

- 1 a) Complete the table below to find three personal measurements.
Use a ruler and round your measurements to the nearest centimetre.

Non-standard unit	Personal measurement
 <p>Hand span</p>	<p>My hand span is:</p> <p>.....18..... cm</p>
 <p>Shoe length</p>	<p>My shoe length is:</p> <p>.....31..... cm</p>
 <p>Number of steps taken to walk 20 metres. (Use the track marked out by your teacher for this.)</p>	<p>The number of steps I took is:</p> <p>.....23..... steps</p>

- 1 b) Find the length of one of your steps in centimetres.



- Divide the distance you walked (in centimetres) by the number of steps you took.
- Round your answer to the nearest centimetre.

Show all your working

$$2000 \div 23 = 87 \text{ cm}$$

One of my step lengths is about ..87.....centimetres

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

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C Sample: Response 2

Now that you have recorded three personal measurements, you will use them to estimate other lengths.

Your teacher will provide an object for you to measure.

- 2 a) Measure the length of the object using your non-standard units. Record them in the table below.

Name of object: black board cupboard

Non-standard unit	Number	Personal measurement (from page 4)
My hand span	<u>20</u> hand spans	<u>18</u> cm
My shoe length	<u>13</u> shoe lengths	<u>31</u> cm
My step length	<u>5</u> step lengths	<u>87</u> cm

- 2 b) Estimate the length of the object by converting your measurements of the object into centimetres.

My calculation of the length of the object:

- using my hand span is 360 cm
- using my shoe length is 403 cm
- using my step length is 435 cm

C Sample: Response 2

2 c) Complete the statements below.

My estimates of the object may not be all the same because ~~with~~ my hand
 I might've been stretching my hand and the pulling
 my fingers back together, my feet I could've been
 leaving a little gap between my heel and toe, and my steps
 I could've gone big step / little step.

I predict the non-standard unit that would give the most accurate estimate over this distance is:

my feet

because when I measured it I went from heel
 to toe and when I measured the cupboard I
 went from toe on one foot to heel on the other and let
 any gap between them most of the time

C Sample: Response 2

Write your teacher's step length here:61..... cm

Suppose you and your teacher walked 1000 metres together.

- 3 a) Who would take the most steps? my teacher would take more steps because she has smaller steps than me
- 3 b) How many more steps would that person take? 490 steps

Explain how you worked this out.
Show all working.

$$\begin{aligned}
 1000 \times 100 &= 100000 \\
 100000 \div 61 &= 1639 = \text{Teachers steps} \\
 100000 \div 87 &= 1149 = \text{my steps}
 \end{aligned}$$

Teachers steps	1639 steps
my steps	1149 steps
	0490 steps

Teacher would Take 490 more steps than me.

STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS

C Sample: Response 2

4. Complete the table below using information from page 8.

Section	Distance walked in section (steps)	Distance walked in section (metres)	Time arrived at end of section	Time taken for section (minutes)
1. school front gate to corner Danzig Rd & Bridge Rd	1450	870	3:29 pm	14
2. corner of Danzig Rd to western end of the bridge	500	1170	3:37 pm	8 mins
3. western to the eastern end of the bridge	2150	1290	3:41 pm	4
4. eastern end of the bridge to corner Park St & Church Ave	2600	270	3:45 pm	3
5. corner of Park St to corner Church Ave & View St	3750	2250	4:01 pm	56
6. corner of Church Ave to home	4750	2850	4:09 pm	8

5 a) Circle the section that is the shortest distance: 1 2 3 4 5 6

5 b) How long did it take Jack to walk home? 93 mins

5 c) How far does Jack walk home in metres? 8700 m

5 d) Where is Jack when he has walked half the distance home? Circle your answer below.

On Danzig Rd

On Bridge Rd

On the bridge

On Park St

On Church Ave

Explain how you worked this out.

I added sections 1, 2, 3, and 4 and then added section 5 and 6. then I looked at section 4 and looked at the second street on the end then looked at the first street on section 5 and got church ave

C Sample: Response 2

- 6 a) Work out the distance (in metres) between the school gate and Jack's home along the new road.

Show all your working.

$$\begin{array}{r}
 1950 \\
 - 1450 \\
 \hline
 0500 \text{ steps} \\
 \uparrow \\
 \text{Bridge Rd}
 \end{array}
 \quad
 \begin{array}{r}
 1950 \\
 - 1950 \\
 \hline
 0000 \text{ steps} \\
 \uparrow \\
 \text{The Bridge}
 \end{array}
 \quad
 \begin{array}{r}
 3750 \\
 - 2600 \\
 \hline
 1150 \text{ steps} \\
 \uparrow \\
 \text{Church Ave}
 \end{array}$$

$$\begin{array}{r}
 500 \\
 300 \\
 + 1150 \\
 \hline
 1950 \text{ steps} \\
 \times 0.6 \\
 \hline
 1170 \text{ m}
 \end{array}$$

- 6 b) State the direction of the school from Jack's house.

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