

6

# MATHEMATICS

## STUDENT BOOKLET



### Walk the line

Given name: .....

Family name: .....

School: .....

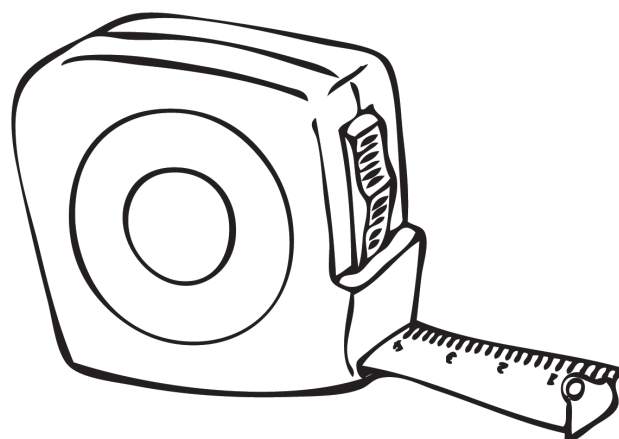


## Setting the scene: Group discussion

It is easy to measure something if you have a ruler or a tape measure, but if you don't have any equipment and you need to find a length or distance, you have to estimate it.

There is a difference between guessing and estimating. If someone asks you to guess what day their birthday is and you say "27 June", you are just as likely to be right — or wrong — as someone who says "8 October". You do not really expect to guess it right and if you do, you know you were just lucky.

To estimate a length or a distance is different. You will do a better job if you first do some thinking and comparing.



### Estimation challenge

Your teacher will hold their arm straight up above their head.

Estimate how far it is from the floor to the tip of their finger.

Write down your estimate here: ..... cm

Think about your answers to these questions:

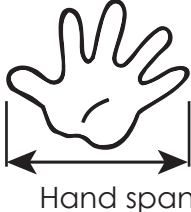

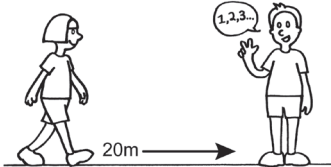
- Did you just guess? (Be honest!)
- Would it have helped to know how tall your teacher is?
- Would it have helped to know the height of the ceiling?
- Would it have helped to know the height of the door?

How can you work out a way to reliably estimate distances without rulers or tape measures?

**STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS**

# 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>..... cm</p>
 <p>Shoe length</p>	<p>My shoe length is:</p> <p>..... 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>..... 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

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

**STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS**

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: .....

Non-standard unit	Number	Personal measurement (from page 4)
My hand span	..... hand spans	..... cm
My shoe length	..... shoe lengths	..... cm
My step length	..... step lengths	..... 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 ..... cm
- using my shoe length is ..... cm
- using my step length is ..... cm

**2 c) Complete the statements below.**

My estimates of the object may not be all the same because .....

.....

.....

.....

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

.....

because .....

.....

.....

.....



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

**Suppose you and your teacher walked 1000 metres together.**

**3 a) Who would take the most steps? .....**

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

*Explain how you worked this out.  
Show all working.*

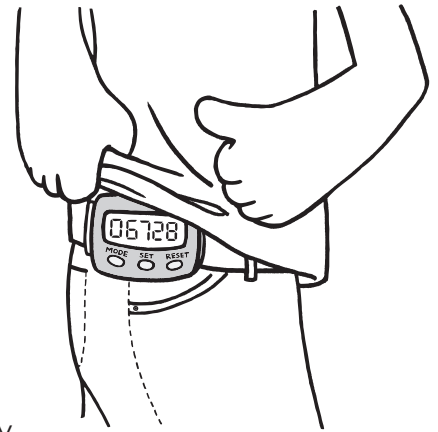
**STOP HERE: WAIT FOR YOUR TEACHER'S DIRECTIONS**

## Estimating distance

At a school in a small country town, the Year 6 teacher bought a set of basic pedometers so students could measure distances using their step lengths. These pedometers only count the steps the wearer takes.

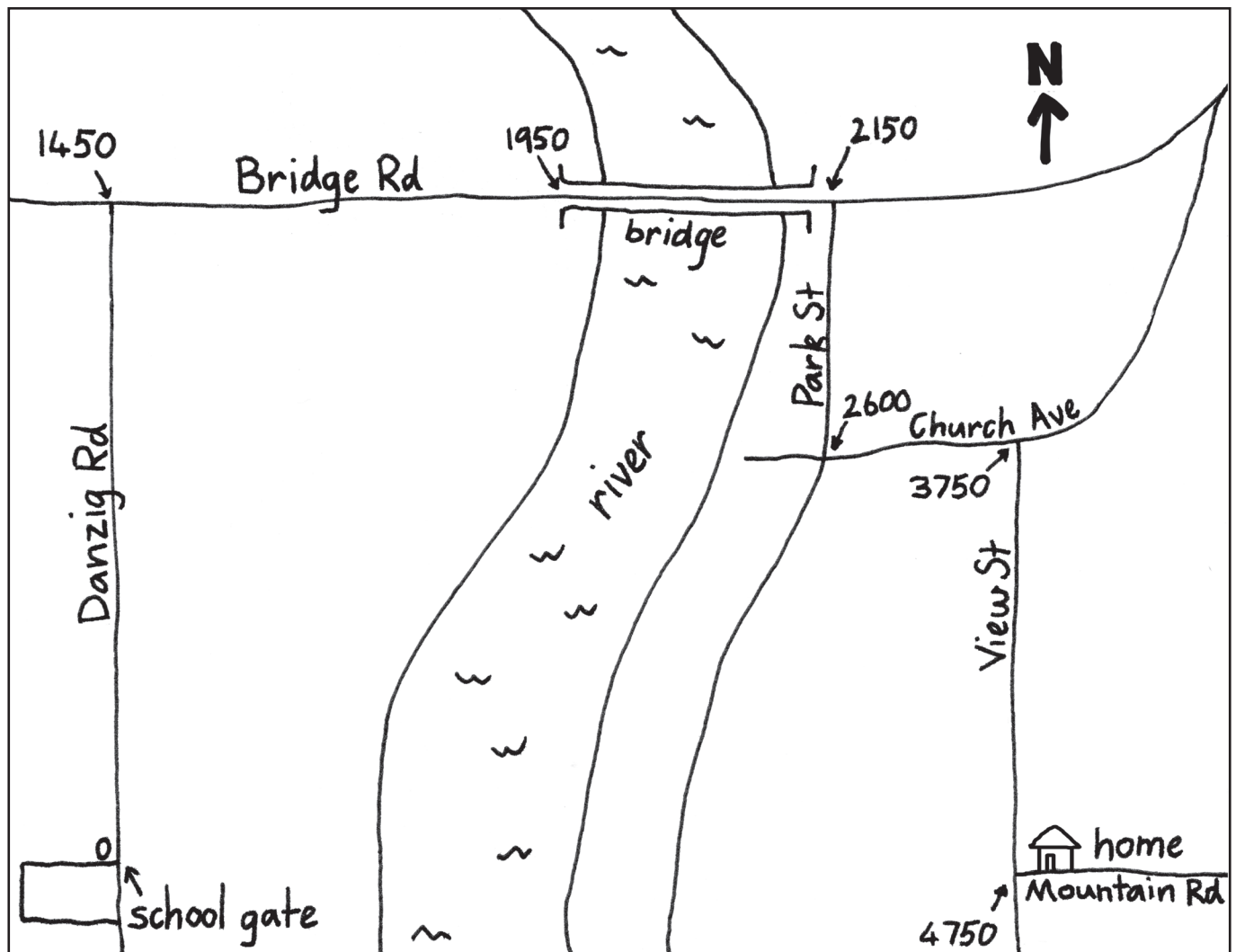
Jack is one of the students in the class. **Jack's step length is 60 centimetres.** He sketched this "mud map" while he walked home one afternoon. A mud map is a rough map to show directions, and is **not drawn to scale**.

Jack sets his pedometer to zero before leaving the school at 3:15 pm. He does not reset the pedometer on the way home. Each number on his mud map records how many **steps** he is away from school at that point.



### Jack's mud map

(not drawn to scale)





## 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			3:29 pm	14
2. corner of Danzig Rd to western end of the bridge	500		3:37 pm	
3. western to the eastern end of the bridge			3:41 pm	
4. eastern end of the bridge to corner Park St & Church Ave		270	3:45 pm	
5. corner of Park St to corner Church Ave & View St			4:01 pm	
6. corner of Church Ave to home			4:09 pm	

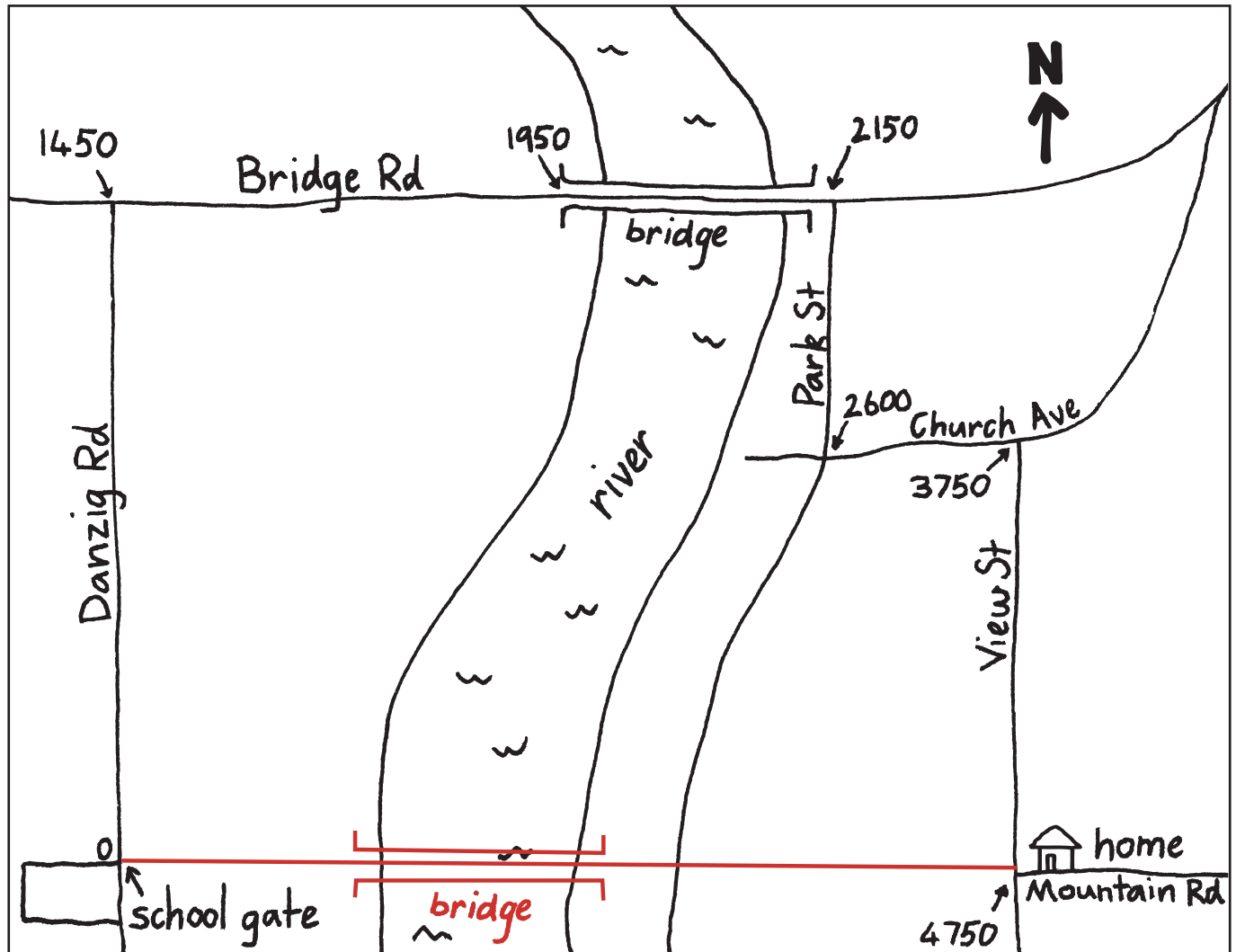
- 5 a) Circle the section that is the shortest distance: 1      2      3      4      5      6
- 5 b) How long did it take Jack to walk home? .....
- 5 c) How far does Jack walk home in metres? .....
- 5 d) Where is Jack when he has walked half the distance home? Circle your answer below.

On Danzig Rd      On Bridge Rd      On the bridge      On Park St      On Church Ave

Explain how you worked this out.

A new road and bridge is to be built in a straight line between the school gate and Mountain Road. Lucky Jack! He will have a new shorter way to walk to school. Look at Jack's new mud map below.

**Jack's new mud map** — with new road and bridge shown in red (not drawn to scale)



Remember:

- Each number on Jack's mud map shows how many **steps** he is from school.
- Jack's step length is 60 cm.
- A mud map is a rough map to show directions, and is **not drawn to scale**.

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

Show all your working.

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

Student .....

**Purpose:** To use non-standard units of measure to estimate distances and to solve related mathematical problems.

Knowledge and understanding	Thinking and reasoning	Communicating
<p>Uses non-standard units to measure. 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>Personal measurements, calculations and mud map tables are completed — entries are generally correct or reasonable. Step length is correctly calculated.</p> <p>Personal measurements and mud map tables contain some correctly completed cells.</p> <p>Personal measurements table is mostly correct.</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>Measurements in non-standard units and estimates are mostly reasonable and explanations show some concept of error. Working shows partial success when providing solutions or explanations.</p> <p>Correctly predicts who has the most steps.</p> <p>An attempt has been made to calculate lengths, times or directions. Explanations are unrelated statements.</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>Working and correct units are present in most solutions. Explanations and working are mostly complete.</p> <p>Provides occasional but mostly irrelevant working.</p>

**Feedback** .....

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