



Investigation 1

How do I measure up?

Our body measurements can be fascinating.

Did you know that your arm span could be the same as your height?

Make a collection of your own body measurements and investigate the relationships between them.

Create a life-sized graph and see how many interesting comparisons you can make.

Could your leg be twice as long as your arm? How does the length of your ear compare with the length of your little finger?



☒ Topics

Before you start the Investigation you need to know...

☐ **MG1** Measurement with metresp100

☐ **MG2** Measurement with centimetres.....p102

☐ **MG3** Grams and kilograms.....p104

☐ **SP3** Column graphs.....p136

☐ **SP5** Interpreting graphs.....p140

Understanding the Investigation

I Read and plan.

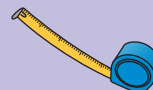
Make sure you understand the meanings of: *armspan*, *relationships*, *circumference*, *personality*, *comparisons*, *double*, *life-sized*, *fascinating* and *compare*.

Read and discuss the rubric.

Download your Investigation plan. This will help you with the organisation and understanding of the Investigation.

Teacher note

- Comprehensive lesson notes, suggestions and resources are available in *iMaths 3 Teacher Book*.
- The Tear-out and Investigation plan for this Investigation can be downloaded from www.imathsteachers.com.au.



Look at **Tear-out 1** *My data* (p179). This is where you will record your personal measurements. Paste a photo of yourself on your page.

As a class, brainstorm parts of your body that would be suitable to measure.

On your *My data* page, make a list of the parts of your body that you will measure.

Using maths

3 Measure and record your details.

Find a partner. With your partner, discuss how you could make accurate measurements of parts of your body. String, tape measures, rulers and rolls of paper could be used.

Ask your partner to take your measurements.
Write them on your *My data* page.

4 Make a column graph.

Use butcher's paper and string, or strips of paper to make a life-sized column graph of your measurements.

Name your graph. Label each axis and column and write a scale on the vertical axis.

Can you see any interesting relationships between the measurements?

Is any measurement double another?

Reasoning and reporting

5 Make interesting comparisons.

Write some interesting sentences comparing your measurements. For example: *The circumference of my head is almost three times my handspan.*

Hand in your *My data* page and explain how you made your measurements as accurate as possible.

Decorate your column graph. Display it to the class and describe your findings.

imathskids.com.au



Go to **imathskids.com.au** –
The Investigation 1 area contains the
Investigation plan, websites and Tear-out that
you need to complete this Investigation.

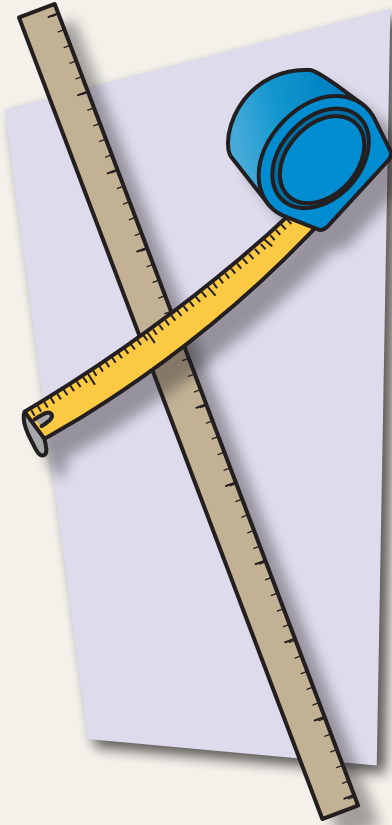
[illegible]

Inquiry

What would you look like if your head, arms and feet doubled in size? To find out, have someone take a full-length digital photo of you, making sure your whole body is in the frame. Print the photo and use a ruler to measure the length of your arms and feet, and the size of your head. Double these measurements. Use your original photo to trace your neck, body and legs (normal-sized), then draw in your head, arms and feet using your new measurements. How do you look?



MG1 Measurement with metres



The **metre** is our basic unit for measuring length. You will need to get a good idea of how to estimate and measure using metres.

To get you thinking in metres, it helps to know the lengths of some everyday objects.

- Doorways are usually 2 metres high.
- A small car is about 4 metres long.
- An Olympic swimming pool is 50 metres long.
- An athletics sprint track is 100 metres long, and so is a soccer field.

Let's measure and label some easy-to-see lengths around the room. For example, the length of the room, the width of the room, the length of the blackboard, cupboards and shelves. Make sure you stick some labels up to help you remember these lengths.

Language reminder

Metres may be abbreviated as **m** (no full stop, no capital letters and no 's' for plural).

Try this

1 Match one measure with each object.

1 metre

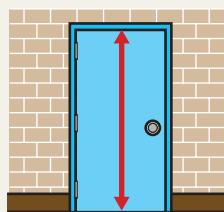
50 metres

2 metres

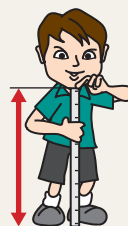
4 metres



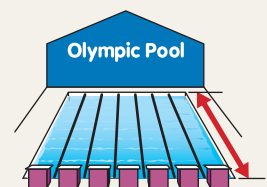
a



b



c



d

Work with a partner for this activity. Discuss how you will measure one metre using a 30 centimetre ruler. Cut a piece of string or ribbon to exactly a metre. Then go outside and place markers one metre apart.



2 How long is a metre?

Now that your markers are exactly one metre apart, try these activities.

- a Can you jump a metre without a run up?
- b What about with a short run up?
- c Can you stretch to one metre doing the splits?
- d Now pick up your one metre string or ribbon. Starting from the ground up, where on your body does one metre reach?
- e Stand with your arms open wide. Starting from one fingertip, how far along your arms does one metre reach?



Problem solving task

Fence me in: How many fence posts are needed for a fence that is 50 metres long if the fence posts are one metre apart? Write your answer in the space provided in *iMaths 3 Tracker Book*.



Challenge

More than a metre: Use your one metre string or ribbon to place markers 10 metres apart. Now try these actions.

- 1 How many **natural walking** paces does it take you to walk 10 metres?
- 2 How many **leaping strides** does it take you to reach 10 metres?
- 3 Use **natural walking paces** or **leaping strides** to estimate 20 metres. Use the string or ribbon to check.



Problem solving strategies

9 Solve a simpler problem

The **solve a simpler problem** strategy involves changing large numbers to small numbers, then solving the simpler problem. You may need to try a few simpler problems with easy numbers and look for a pattern you can use with larger numbers.



Share this problem

To cut this log into 12 pieces, how many cuts are needed?

Discuss the solution

Solving a simpler problem will help here.

Tear a strip of paper to represent the log.

Cut the 'log' into two pieces. One cut gives you two pieces.

Tear another piece of paper to represent the log. Cut the 'log' into three pieces.

Two cuts gives you three pieces.

The number of cuts needed is one less than the number of pieces.

Cutting the log into 12 pieces will need 11 cuts.

YOUR TURN

Our swimming club wants to have 8 lanes for a carnival in our 50 m pool.

How many ropes are needed in the pool?

Use the **solve a simpler problem** strategy to solve this problem.

Strategy 9



1	Guess and check	6	Check for relevant or irrelevant information
2	Make a table or chart	7	Find smaller parts of a large problem
3	Draw a picture or diagram	8	Make an organised list
4	Act out the problem	9	Solve a simpler problem
5	Find a pattern or use a rule	10	Work backwards



Mental computation strategies

+ Addition strategies

- A Friendly chunks
- B Friendly pairs
- C Add 10, add 100
- D Friendly and fix
- E Further facts
- F Place value

A Friendly chunks

Question

Strategy: Build to ten.

Answer

1 $18 + 6$	<p style="text-align: center;">$18 + 6 = 24$</p>	24
2 $65 + 7$		72
3 $136 + 8$		144

B Friendly pairs

Question

Strategy: Find pairs of numbers that add to 10.

Answer

1 $9 + 5 + 5$	$9 + \underbrace{5 + 5}_{10}$	19
2 $7 + 1 + 3 + 9$	$\underbrace{7 + 1}_{10} + \underbrace{3 + 9}_{10}$	20
3 $2 + 4 + 6 + 8$	$\underbrace{2 + 4}_{10} + \underbrace{6 + 8}_{10}$	20

C Add 10, add 100



Strategy: To add 10, change the tens place.
To add 100, change the hundreds place.

Question

Answer

1 $858 + 10$	$8\mathbf{5}8 + 10 = 8\mathbf{6}8$	868
2 $495 + 100$	$\mathbf{4}95 + 100 = \mathbf{5}95$	595
3 $6270 + 100$	$6\mathbf{2}70 + 100 = 6\mathbf{3}70$	6370

D Friendly and fix

Strategy: To add numbers that end with 9, change to a ten then fix by taking 1.

Question

Answer

1 $83 + 9$	<p>$83 + 10 = 93$, -1 (friendly) (fix)</p>	92
2 $225 + 19$	<p>$225 + 20 = 245$, -1 (friendly) (fix)</p>	244
3 $168 + 29$	<p>$168 + 30 = 198$, -1 (friendly) (fix)</p>	197