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 metres p100
- ☐ **MG2** Measurement with centimetres..... p102
- ☐ **MG3** Grams and kilograms..... p104
- ☐ **SP3** Column graphs..... p136
- ☐ **SP5** Interpreting graphs..... p140

Understanding the Investigation

1 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.

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Materials

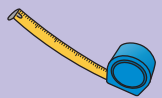

Internet access


Tear-out 1


Coloured pencils


Calculator


Digital camera


Tape measure


Craft materials

2 Get ready to measure.

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.

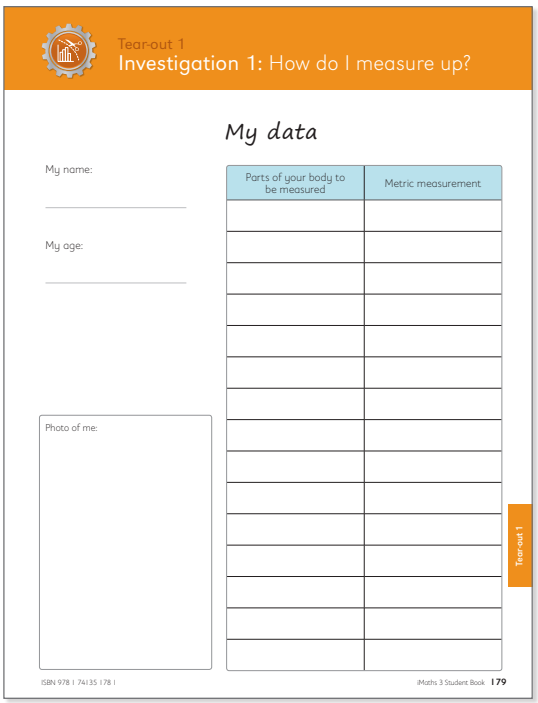
Write some interesting sentences comparing your measurements. For example: *The circumference of my head is almost three times my handspan.*

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.



Tear-out 1
Investigation 1: How do I measure up?

My data

My name:

My age:

Photo of me:

Parts of your body to be measured	Metric measurement

Tear-out 1

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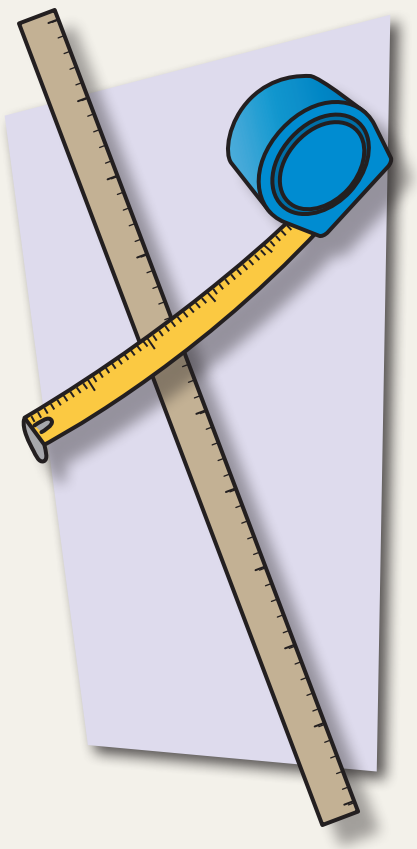
Inquiry

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

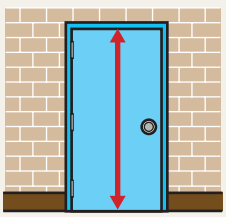
Metres may be abbreviated as **m** (no full stop, no capital letters and no 's' for plural).

Try this

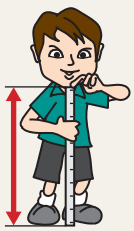
1 Match one measure with each object.

1 metre | 50 metres | 2 metres | 4 metres

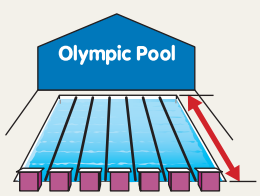
a ____



b ____



c ____



d ____

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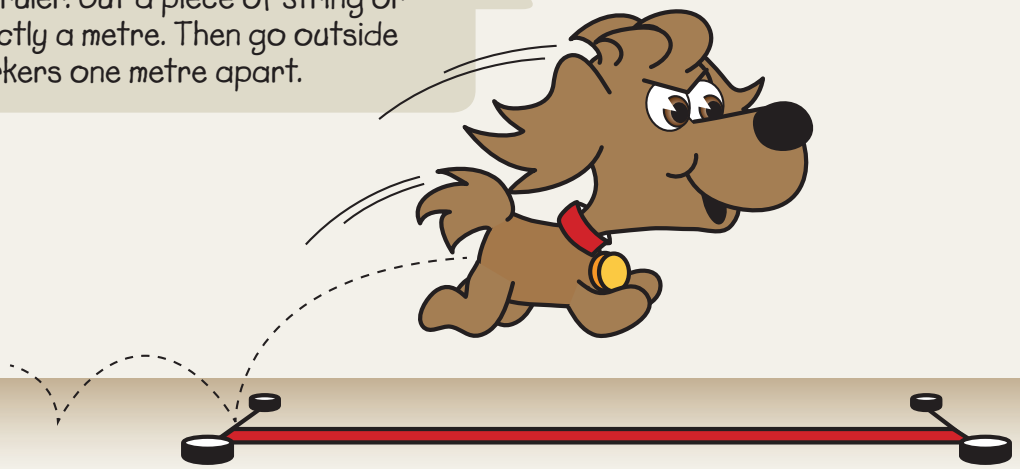
Work with a partner for this activity. Discuss how you will measure one metre using a 30 centimetre ruler. Cut a piece of string or ribbon to exactly a metre. Then go outside and place markers one metre apart.



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.

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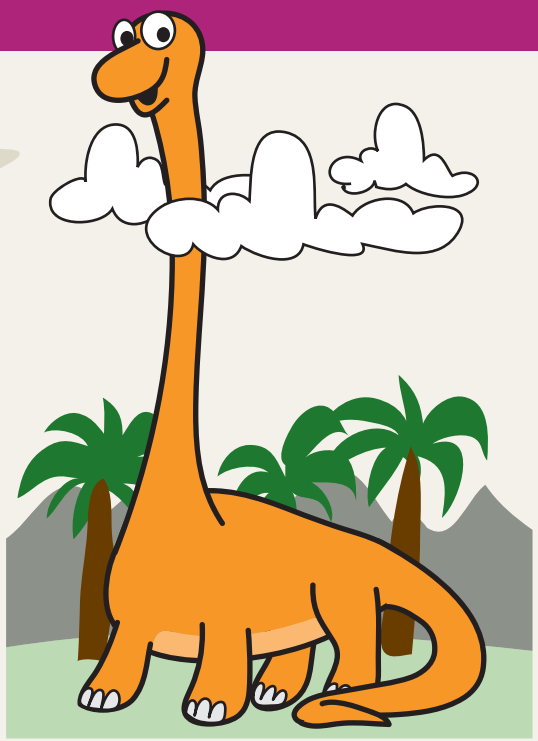
SP3 Column graphs

Drawing a graph is a useful way of displaying information. A **column graph** shows information using bars or columns. Column graphs allow us to quickly compare information. For example, it is easy to see which is the longest dinosaur in the graph below.



Animal	Length (metres)
Seismosaurus	36
Supersaurus	30
Antarctosaurus	30
Barosaurus	27
Mamenchisaurus	27
Diplodocus	27
Ultrasauros	25

Try this

1 Display this extra information on the column graph above.

Dinosaur	Length (metres)
Brachiosaurus	25
Pelorosaurus	24
Apatosaurus	21

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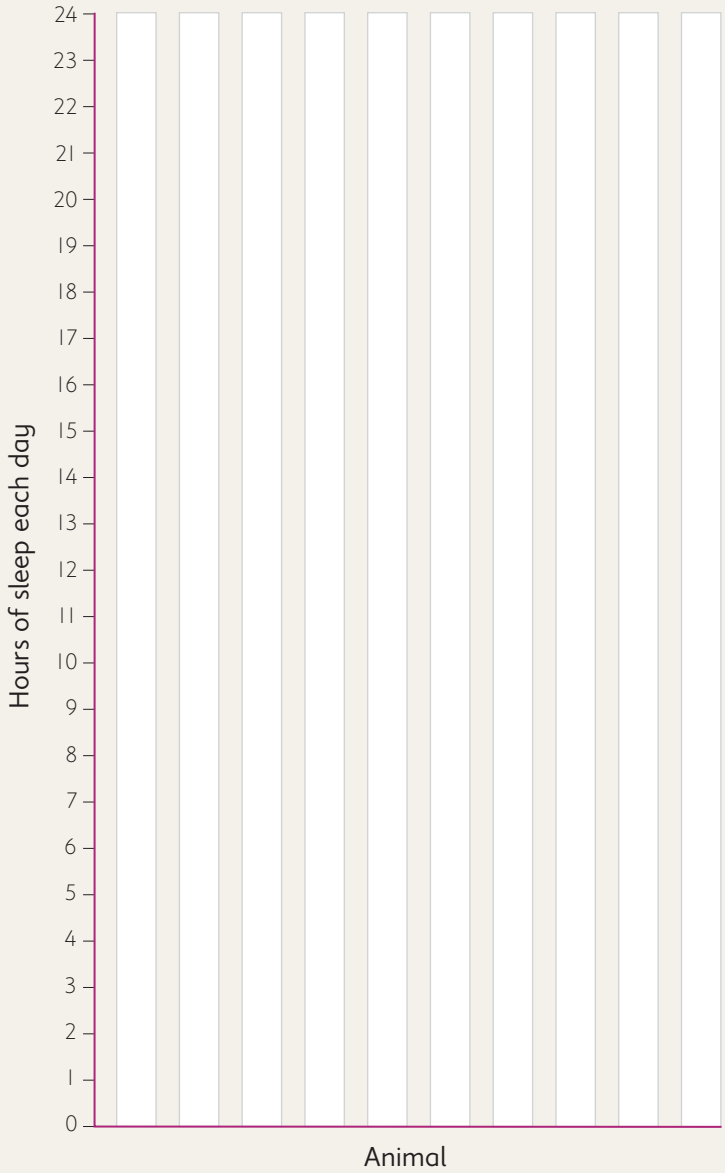
2 The table below lists the world's ten sleepiest animals and the number of hours they sleep each day.

Display this information as a column graph. Label each column with the name of the animal and colour the graph.

The world's sleepiest animals



Animal	Hours of sleep each day
Koala	22
Sloth	20
Armadillo	19
Opossum	19
Lemur	16
Hamster	14
Squirrel	14
Cat	13
Pig	13
Echidna	12

3 About how many hours does a koala spend awake in one week?

4 Which animal is asleep for about half of each day?

5 Which animals spend less than six hours awake each day?

Challenge

How sleepy are you? What time do you usually go to bed? What time do you wake up? Use these two times to work out how long you usually sleep. Add another column to the graph above to show **your** hours of sleep.

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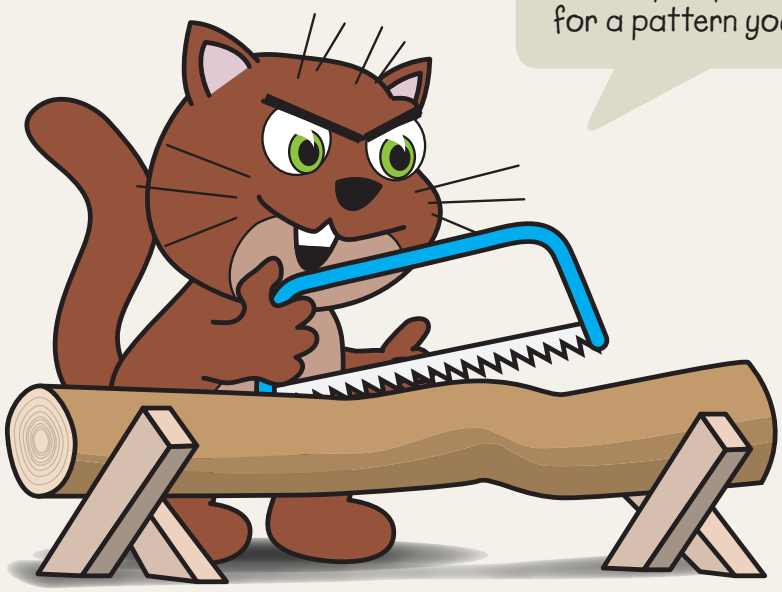
Problem solving strategies
9 Solve a simpler problem

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**.

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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?

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

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