FSKNUM015
Estimate, measure and calculate with routine metric measurements for work

Release 1

Learner guide

ASPIRE
Learning Resources

FSKNUM015

Estimate, measure and calculate with routine metric measurements for work

Release 1

Learner guide

Aspire Version 1.1

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Contents

Before you begin

This learner guide is based on the unit of competency *FSKNUM015 Estimate, measure and calculate with routine metric measurements for work,* Release 1.

How to work through this learner guide

Your trainer or assessor will tell you which parts of the learner guide you need to read, and which activities you need to finish. The learner guide has the following parts.

Part	How you use it
Learning content	Read each topic. If you do not understand something, talk to your trainer.
Examples	This learner guide has examples of completed documents that may be used in a workplace.
Video clips	Where you see a QR code, you can use a smartphone or tablet to access video clips about the content. For information about how to download an app that will read the QR code or for more help, please visit our website: www.aspirelr.com.au/help.
Learning checkpoints	Complete learning checkpoints to make sure you understand what you have read. Your trainer will tell you which activities to do.
What you have learnt	At the end of the learner guide, there is a list of what you have learnt. You can use this to check if you are ready for the final assessment.

Words to remember

As you read the learner guide, use this section to write down words you need to remember.

There is a space for you to write the word and a space for you to write down what the word means.

This will help you to learn the words.

Word	What it means

Word	What it means

Your story

Today is your first day working as an assistant at Willow Bend Holiday Camp. You will be helping Ben. Ben is the camp cook and handyman, and your supervisor. The camp has 30 children and 10 adults, including Ben and yourself.

You have previously worked at Willow Bend Aged Care Home. Some of the tasks you did there are similar, so that experience will help you to work at the holiday camp.

When Ben is preparing to cook, he will give you a list of the food items he needs from the storeroom and coolroom. He will need some items measured out for him in the kitchen.

The storeroom also needs a new shelf. Ben would like you to get the timber ready for him so he can build it.

Ben also wants to build a new play area. The area needs to be covered in shade cloth, so the children can play in the shade. He wants you to work out how much shade cloth he needs to order.

Ben explains your tasks. Tasks are things you do, to do your job.

Watch this video about your role at Willow Bend Holiday Camp.

v1120

Your tasks

Learn about your tasks below.

Check the temperature of the coolroom.

Check the temperature gauge in the coolroom to make sure it is the right temperature to keep the food cool.

Write down the temperature of coolroom.

Record (write down) the temperature of the coolroom in a logbook twice a day.

Prepare the ingredients for Ben.

Get the ingredients (food items) and food out of the storeroom and coolroom. Measure the ingredients for Ben to cook with.

Make drinks for the children at the camp.

Measure and mix cordial and water for the children's drinks.

Measure and cut the timber for a shelf.

Calculate and cut the length of timber needed to make a shelf in the storeroom.

Work out how much shade cloth to order.

Calculate the area to be covered in shade cloth.

Day 1

On your first day of work, Ben shows you around the camp. He shows you the storeroom and the coolroom.

The storeroom is used for storing dry goods. Dry goods are food items, like flour and canned foods, which do not need to be kept cool.

The coolroom is where the milk, fruit and vegetables are stored to keep them cold. Ben shows you where the thermometer is in the coolroom. The thermometer tells you the temperature of the coolroom. He explains that you need to read the temperature of the coolroom twice a day. He shows you the logbook and where to record the temperature readings.

Today you will help Ben make soup. You need to get the right ingredients out of the coolroom and storeroom for Ben.

The coolroom

Watch this video about the coolroom at Willow Bend Holiday Camp.

v1121

Workplace tasks and measurements

Ben explains that many of your tasks require you to measure different things. For example, Ben wants you to measure the timber for the new shelf and to work out how much shade cloth is necessary to cover the new play area. He also wants you to measure amounts for the different things he cooks.

Each workplace has different workplace tasks.

Depending on where you work, you may use different measurements when completing tasks and using documents.

Different types of measurement are used to measure different things.

You may need to measure:
• length, for example, how long the timber needs to be
• perimeter, for example how far it is around the outside of a sport's oval
• mass or weight, for example, how much the carrots weigh
• capacity or volume, for example, how much water the jug holds
• temperature, for example, how hot the food is
• area, for example, how much shade cloth you will need.

These different types of measurements are measured in different units.

Different types of measurements in the workplace

These are some examples of the type of task you may need to do in different workplaces, what you may need to measure and the units of measurement that are used.

Timber yard

Workplace task:

Measure the length, width and height of timber

Units of measurement used:

- Millimetres
- Metres

Examples of workplace documents that you may need to read:

Plans for building houses, fences or sheds use measurements.

Café

Workplace task:

Measure the quantities of ingredients used in a recipe.

Units of measurement used:

- Millilitres
- Litres
- Grams
- Kilograms

Examples of workplace documents that you may need to read:

Recipes, orders for food ingredients

Bakery

Workplace task:

Measure how hot the oven has to be to cook the bread and pastries.

Units of measurement used:

- Degrees

Examples of workplace documents that you may need to read:

Recipes, workplace health and safety (WHS) documents, standard operating procedures (SPO)

Maths language and measurement

In Australia, most things are measured in metric units. The metric system uses common prefixes for different measurement units. A prefix is a group of letters that go before a word to make a new word.

The most important prefixes in the metric system are in the table below.

Prefix	Meaning	Example
kilo	One thousand times – 1,000	• Kilogram = 1,000 grams • Kilometre = 1,000 metres
centi	one hundredth of – $^1/_{100}$	• Centimetre = $^1/_{100}$ th of a metre. There are 100 centimetres in a metre. • Cent = $^1/_{100}$ th of a dollar. There are 100 cents in a dollar.
milli	One thousandth of – $^1/_{1000}$	• Millimetre = $^1/_{1000}$ th of a metre. There are 1000 millimetres in a metre. • Millilitre = $^1/_{1000}$ th of a litre. There are 1000 millilitres in a litre.

Some prefixes show the units are larger, like kilo. Others, like centi and milli, show the units are smaller. You'll find out more about these units in the next part of the Learner's guide.

Length

Length is how long, wide, high or deep something is. Sometimes you also need to measure the distance around something. For example, you may need to measure the distance around the play area. The distance around something is called the perimeter.

You usually measure length in:

- kilometres (km)

- metres (m)

- centimetres (cm)

- millimetres (mm).

Kilometres are the biggest unit, then comes metres, centimetres and millimetres. Millimetres are the smallest unit that is commonly used.

Units used for measuring length

The table below provides some more information about the different units used to measure length and perimeter.

Unit	Abbreviation	Description
millimetres	mm	• A millimetre is about the thickness of a plastic card such as a credit card. • Millimetres is used in the building industry where it's important to be very exact with measurements.
centimetres	cm	• A centimetre is about 1 finger wide. • Centimetres are used for everyday things such as the dimensions of a parcel to be sent by post. They are also used for a person's height and dimensions of objects such as a table. • 1 cm = 10 mm
metre	m	• A metre is about the same length as a guitar or the width of a doorway. • Metres are used for things such as the dimensions of a swimming pool, how far to park from a fire hydrant, and the size of a room. • Sometimes dimensions are expressed as metres and centimetres. For example, a piece of material is 1m and 20 cm. • 1 m = 100 cm and 1000 mm
kilometre	km	• Kilometres are used for the distance between towns or how far a plane travels. • A road sign may show that there is a risk of kangaroos for the next 5 kilometres. • 1 km = 1000 m

Here is a section of a ruler.

It has millimetres and centimetres marked on it. The smallest divisions along the bottom are the millimetres and the larger marks are the centimetres.

Mass or weight

Mass or weight is how heavy or how light something is.

Weight is measured in:

- grams (g)
- kilograms (kg
- tonnes.

Tonnes are the biggest unit, followed by kilograms and grams. Tonnes are only used for very heavy objects, like cars and trucks. Tonnes aren't used very often.

Units used for measuring weight

The table below provides some more information about the different units used to measure weight.

Unit	Abbreviation	Description
gram	g	• Measures weight – usually up to 1000 g (or 1 kg). • Grams are very light. For example, 1 gram is about as heavy as a couple of matches and an unused tea bag weighs about 2½ grams. • Grams are often used to measure quantities of food. These oranges weigh 550 grams.
kilogram	kg	• Measures weight – usually more than 1 kg. • 1 kilogram is about the same weight as a litre of milk or juice or water. • Kilograms are used to measure a range of things, such as food and bags of cement. • If something weighs over a kilogram, we may talk about it in kilograms and grams. For example 2kg and 200g. • 1 kg = 1000 g These oranges weigh 1 kg.

Unit	Abbreviation	Description
tonne	t	• Measures weight of very heavy things such as cars, boats, large animals. • An elephant can weigh up to 6 tonnes. A small car weighs a bit less than a tonne. • 1 t = 1000 kg • The empty shipping container below would weigh about 2 tonnes.

Capacity or volume

Capacity is the amount something can hold. For example, the capacity of a glass of water is how much water the glass can hold. Volume is common word used for capacity.

Volume is measured in:

• millilitres (ml or mL)

• litres (l or L).

Millilitres are the smaller unit.

Units for measuring volume

The table below provides some more information about the different units used to measure volume.

Unit	Abbreviation	Description
millilitre	mL or ml	• Measures volume – usually up to 1000 mL (or 1 L). • A teaspoon holds about 5 mL. A cup holds about 250 mL. • This syringe has the capacity to hold 2 millilitres. • Millilitres are used to measure small amounts of liquid such as liquid fertiliser, cooking, medicine, drinks.
litres	L or l	• Measures volume – usually 1 litre (L). • A litre is the size of a litre container of fruit juice or milk. • This bottle has the capacity to hold 1 litre. • Litres are used to measure liquid such as petrol, oil, paint, cleaning chemicals, and the amount of water in a watering can.

Temperature

Temperature is the measurement of how hot or cold something is. Temperature is measured in degrees. In Australia, temperature is measured in degrees Celsius (^{0}C).

When you talk about temperature, you talk about degrees. The symbol for degree is ^{0}, for example 23^{0}. We often put the C after the degree symbol to show we are talking about Celsius. In some other parts of the world, temperatures are measured on a different scale called Fahrenheit. If we talk about a temperature in Fahrenheit, we write ^{0}F.

- 0^{0}C is the temperature water freezes at.
- 23^{0}C is a pleasant temperature for working in an office.
- 36.6^{0}C is the normal body temperature of a person (it can vary a little bit).
- 100^{0}C is the temperature water boils at.
- 180^{0}C is the temperature muffins are cooked at in the oven.
- 700–1,200^{0}C is the temperature of lava from a volcano.
- –50^{0}C is about the temperature where planes fly.

In Australia, the coldest temperature recorded was –23C^{0} at Charlotte Pass in New South Wales in 1994.

The coldest temperature recorded on earth was –89.2 °C in Antarctica on 1983.

Converting units of measurement

When you use measurements, you often need to be able to easily and quickly change from one metric unit to another. For example, you might need to change a measurement all in centimetres into metres, or from litres into millilitres, and so on. This is called converting the units. When you convert measurements, it means that you change from one measurement to another.

To know how much of an ingredient to get from the storeroom or coolroom, you may need to convert measurements.

To work out how much timber Ben needs for the shelf in the storeroom, you may need to convert measurements.

You can write metric measurements in different ways. For example, 3250 mm can be written as:

- 3 metres and 250 millimetres
- as a decimal fraction of the larger unit, e.g. 3.250 m or 32.50 cm
- sometimes as a fraction, e.g. 3¼ m.

Here are some examples.

Millimetres (ml)	**Millimetres (mm) converts to Centimetres (cm)** • 10 millimetres = 1 centimetre • 5 millimetres = ½ a centimetre = 0.5 centimetres • 50 millimetres = 5 centimetres
	Millimetres (mm) converts to Metres (m) • 1000 millimetres = 1 metre • 500 millimetres = ½ a metre = 0.5 metres • 250 millimetres = ¼ of a metre = 0.25 metres
Centimetres (cm)	**Centimetres (cm) converts to Metres (m)** • 100 centimetres = 1 metre • 50 centimetres = ½ a metre = 0.5 metres • 25 centimetres = ¼ a metre = 0.25 metres
Metres (m)	**Metres converts to Kilometres (km)** • 1000 metres = 1 kilometre • 500 metres = ½ kilometre metre = 0.5 kilometres • 250 metres = ¼ of a kilometre metre = 0.25 kilometres
Grams (g)	**Grams (g) converts to Kilograms (kg)** • 1000 grams = 1 kilogram • 500 grams = ½ a kilogram = 0.5 kilograms • 250 grams = ¼ of a kilogram = 0.25 kiligrams
Millilitres (ml)	**Millilitres converts to Litres (l)** • 1000 millilitres = 1 litre • 500 millilitres = ½ a litre = 0.5 litres • 250 millilitres = ¼ of a litre = 0.25 litres

How to convert units of measurement

The metric system is based on 10s, 100s, 1000s, etc. This makes it easy to change or convert from one unit to another, for example, from mm to m. To change from one unit to another, you can use rules for multiplying and dividing by 10s, 100s, 1000s, etc. – or you can use your calculator to convert units.

Multiplying and dividing by 10s, 100s and 1000s

Use your calculator to check the following sums:

Multiplying:	Dividing:
37.25 x 10 = 372.5	372.5 ÷ 10 = 37.25
37.25 x 100 = 3725.0	372.5 ÷ 100 = 3.725
37.25 x 1000 = 37250	372.5 ÷ 1000 = 0.3725

You should see some patterns in the answers:

*   the digits (3,7, 2 and 5) don't change at all
*   only the decimal point moves
*   when you multiply, the decimal point moves to the right
*   when you divide, the decimal point moves to the left
*   when you multiply or divide by 10, the decimal point moves 1 place
*   when you multiply or divide by 100, the decimal point moves 2 places
*   when you multiply or divide by 1000, the decimal point moves 3 places.

The number of places the decimal point moves matches the number of zeroes.

Key Point

When you need to multiply or divide by 10s, 100s, 1000s etc, you:

- move the decimal point once for each zero in the 10, 100, 1000. etc.

- when you **multiply**, the decimal point moves to the **right**

- when you **divide**, the decimal point moves to the **left**.

Helpful hints
• If a number hasn't got a decimal point, for example 234, then the decimal point is at the end and you can write in a point zero (.0). For example, 234 = 234.0
• When you need to move the decimal point left and in front of the digits that you have, then you may need to put in some extra zeroes between the decimal point and the first digit. For example, if you want to convert 37.5 mL into litres, you need to divide by 1000. To do this you need move the decimal point three places to the left. This means you need to put in a a zero before the 3.

37.5 mL   **.0375 litres**

Converting units

When you change from one metric unit to another you need to follow these steps:

1. Decide what number is involved (the conversion factor) between the two units: usually 10, 100 or 1,000. In this example, for metres and millimetres, it is 1,000.

2. Decide whether you are changing from a large unit to a smaller unit or from a small unit to a larger unit. This tells you whether you need to multiply or divide.

Large (m) to small (mm)	Small (mm) to large (m)

• This means you'll end up with lots more of the smaller units, so you have to **multiply**.
• **Multiply** by the conversion number (1,000)
   – move the decimal point 3 places to the **right**
      or
   – use your calculator to work it out.
	• This means you'll end up with less of the larger units, so you have to **divide**.
	• **Divide** by the conversion number (1,000)
	   – move the decimal point 3 places to the **left**
	      or
	   – use your calculator to work it out.

Example: Change 3.27 m to mm • Conversion factor is 1000 (1000 mm = 1 m) • Changing from a larger unit to a smaller unit so you need to **multiply** • Multiply 3.27 by 1000. • This means move the decimal point three places to the right (or use your calculator). So, 3.27 m = 3.27 x 1000 = 3270 mm	**Example: Change 85 mm to m** • Conversion factor is 1000 (1000 mm = 1 m) • Changing from a smaller unit to a larger unit so you need to **divide** • Divide 85 by 1000. • This means move the decimal point three places to the left (or use your calculator). So, 85 mm = 85 ÷ 1000 = 0.085 m

Practice converting units

Use this method to practice converting units and convert the following:

3.25 m into mm	
79 mm into m	
5 km into m	
7.9 cm into m	
325 mL into L	
2.5 L into mL	
3.2 kg into g	
13,500 g into kg	

Measuring equipment

Different types of measuring equipment are used to measure different metric units. For example, you can use a tape measure to measure length, but you need to use scales to measure weight.

In the next part of the Learner's guide, you will find out more about measuring equipment.

Tools to measure length

There are different ways to measure how long, high or wide something is. Different workplaces will use different equipment.

At Willow Bend Holiday Camp, you need to measure how much timber to cut for the new shelf in the storeroom. You will use a tape measure to measure the size of the shelf.

Here are examples of equipment that can be used to measure length.

|	
	Caliper • These are used for very accurate measurements. They can be manual or digital. • Calipers are usually used in the manufacturing or engineering industries, for example, to measure the thickness of thin metal sheets.
	Ruler • A ruler measures short lengths, typically in millimetres and centimetres. • However, many rulers also feature measurements in the imperial system, such as inches. • In Australia we don't use this, so make sure you use the metric system instead.
	Tape measure • A tape measure is used to measure lengths of up to 30–50 metres. • The tape measures length in millimetres, centimetres and metres.

Laser distance measurer

- Laser distance measures use a laser to measure length very accurately.
- Carpenters and builders often use them instead of tape measures.
- Some of the more sophisticated ones can be used to measure kilometres.

Trundle wheels

- A trundle wheel measures lengths in metres.
- However, it is not as accurate as a tape measure or a laser meter, so it should be used only as a guide.
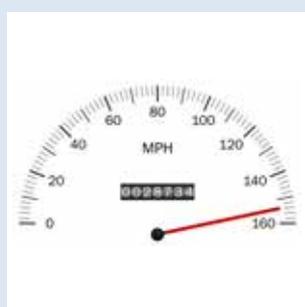
Odometer

- An odometer measures the total distance a car has travelled in its lifetime.
- Newer models can also be programmed to measure the distance driven between two points during each trip.

Tools to measure weight

Scales are used to measure how heavy something is. Different workplaces will use different types of scales depending on what they are weighing.

At Willow Bend Holiday Camp, flour, sugar, fruit and vegetables are weighed on scales.

Here are examples of some different types of scales.

	Analogue kitchen scales • Small, traditional scales used to measure small household items, such as food for recipes. • When an item is placed in the bowl, the hand on the display moves around the dial and records how much it weighs.
	Digital kitchen scales • These scales are similar to analogue scales, however, the weight of an item is displayed on a digital display. • Digital scales are more reliable to use when you need a very precise weight.
	Bathroom scales • Found in people's homes, often in the bathroom. • These scales are typically used to measure a person's weight.

	Commercial digital scales
	• Found in shops such as green grocers and supermarkets. • Similar scales are used to weigh parcels and large letters at the post office.
	Weighbridge • These types of scales are incredibly large and are used to measure the weight of large objects, such as trucks and shipping containers.

Tools to measure volume

There is different equipment to measure volume. Different workplaces will use different types of equipment depending on what they are measuring.

At Willow Bend Holiday Camp, you use a jug to measure each litre of water when making cordial drinks for the children.

Here are examples of some different types of equipment to measure volume.

For example:

	Jug • This jug will hold a volume of 500 mL. • A jug like this would be used to measure volume in a kitchen.
	Spoons • Measuring spoons like this are used at home and in the kitchen. • The largest one is a tablespoon. It holds a volume of 20 mL. • The smallest one is a ¼ teaspoon. It holds a volume of 1.25 mL.
	Cup • This cup holds a volume of 250 mL. • A cup would be used to measure volume at home and in a kitchen.

Measuring cylinders

- These come in different sizes and hold different volumes.
- They are used in science laboratories can also be used in other work contexts, such as to measure liquid fertiliser or weed killer.

Pipette

- Pipettes are used in science laboratories to measure small amounts accurately.

Liquid flow metre

- These are used in industry to measure the flow or amount of liquid.

Tools to measure temperature

Thermometers or temperature gauges are used to measure temperature. Traditionally thermometers have small tubes and a bulb of liquid at the bottom. The hotter the temperature, the higher the liquid from the bulb rises in the tube. There are markings along the side of the glass tube that show the temperature.

Today, many thermometers and temperature gauges are digital. Different workplaces will use different types of thermometers depending on what they are measuring.

At Willow Bend Holiday Camp, you use a thermometer to check the temperature in the coolroom.

Here are examples of thermometers used to measure temperature.

	Temperature gauge for cooking • These are used to measure the temperature of food that's being cooked. • These days it would be more common to use a digital thermometer for this.
	Probe thermometer • These are used to check the temperature of food. • These are used in shops, cafes and restaurants where food needs to be kept in a cool room or where food has to be kept hot such as in a food display.
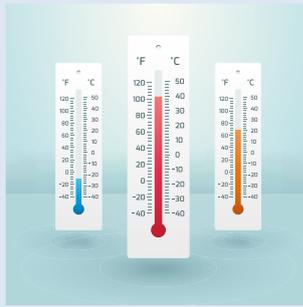
	Bulb thermometer • These can be used to measure the air temperature.
	Digital thermometer • There are many different sorts of digital thermometers: the one in the picture is used to take a person's temperature. • Before digital thermometers, you would have to put a bulb thermometer in your mouth to find your temperature.
	Infrared laser thermometer • Used in kitchens. You point it at the object and it gives the temperature. • Used in a range of workplaces, for example to measure temperature in kitchens, on hot engine parts, electrical connections, etc.

Selecting measuring equipment

You need to use the right equipment for what you are measuring. The equipment used for measuring length is different from the equipment used to measure weight. The equipment used for measuring large amounts is different from equipment used to measure small amounts.

For example, if you need to measure the length of something quite long, use a tape measure rather than a ruler. If you need to measure something in millimetres, use equipment that has millimetre markings on it, such as a ruler.

To choose the best equipment for the task, think about the task, what you need to measure and what the best tool for the task would be. You also need to think about safety and whether one piece of measuring equipment would be safer than another piece.

Here are two examples about choosing the right measuring equipment.

Example 1
• The length of two tables is approximately 6 metres. To do an exact measurement, it would be better to use a tape measure than a ruler. A tape measure can reach from one end of the table to the other. You can measure the length of the tables by measuring it once.
• If you use a 30 cm ruler, you will need to place the ruler down 20 times to get the measurement. It may also not be as accurate (exact).
The right equipment to use in this case is a tape measure.
Example 2
• To make mashed potato, 500 ml of milk needs to be mixed into the potatoes. To measure 500 ml, it is better to use a 1-litre jug than a small measuring cup that only holds 50 ml.
• If you use a 1-litre jug, you would fill the jug ½ full (to 500 ml).
• If you use a 50 ml cup, you would need to fill the cup 10 times to add 500 ml of milk to the potatoes.
The right equipment to use is the jug.

Using the right piece of equipment helps you to work more efficiently.

Set up and safe use of equipment

When you use equipment, you need to make sure that you are using it safely. That means you, and those around you, need to follow the safety instructions for the equipment being used. It also means you need to make sure the equipment is safe and you are using it properly.

Some measuring equipment needs to be checked regularly to make sure it is accurate (correct). For example, a thermometer that is used for checking the temperature of cooked food should be checked regularly to see if it is giving the correct temperature. A thermometer used to check cool temperatures, such as in a coolroom, also needs to be checked regularly to see if it is accurate. If the thermometer isn't giving the right reading, it should not be used.

Some measuring equipment can be calibrated to ensure it is measuring correctly. This means that it needs to be checked before it is used to make sure it is accurate and giving the correct measurement. Some tools are calibrated differently depending on the kind of measurements they take. Usually your supervisor will check the accuracy of equipment and calibrate it, if necessary.

You also need to use equipment correctly. For example, when you are using scales, remember to set the scales on '0' before you use them. If you are weighing something in a basin or a container, make sure the scales are set to '0' when the basin or container is on them as you want to weigh what's in the basin and container, not the basin and container plus what's in them.

If you are using a tape measure of ruler, make sure you measure from the 0. Often tape measures and rulers have a space at the end, before the 0.

What has happened on Day 1

On your first day of work at Willow Bend Holiday Camp, you have learned about:

- identifying and interpreting measurements

- units of measurement

- converting units of measurement

- measuring equipment

- selecting and using measuring equipment.

Learning Checkpoint: Day 1

1. What does the prefix 'kilo' mean? Tick the correct answer.

   ❑ 100 times bigger

   ❑ 10 times bigger

   ❑ 1000 times bigger

2. What unit of measurement would you use to measure the height of something? Tick the correct answer.

   ❑ grams

   ❑ metres

   ❑ kilograms

   ❑ millilitres

3. Which metric unit would you use to measure the size of the top of a table? Tick the correct answer.

   ❑ kilograms

   ❑ kilometres

   ❑ litres

   ❑ centimetres

4. What unit is a kilogram made up of? Tick the correct answer.

   ❑ millilitres

   ❑ grams

   ❑ degrees

   ❑ centimetres

5. How many grams are there in 1 kilogram?
   Tick the correct answer.

   ❑ 100

   ❑ 10

   ❑ 1000

6. Which metric unit would you use to measure water?
   Tick the correct answer.

   ❑ grams

   ❑ metres

   ❑ millimetres

   ❑ millilitres

7. What is the abbreviation for millimetres?
   Tick the correct answer.

   ❑ mL

   ❑ mm

   ❑ mt

8. What unit is used to measure temperature?
   Tick the correct answer.

   ❑ Grams

   ❑ Degrees

   ❑ Millilitres

9. What does the symbol (°C) mean? Tick the correct answer.

   ❑ Weight in grams

   ❑ Temperature in degrees Celsius

   ❑ Length in centimetres

10. How many millilitres are in ½ a litre? Tick the correct answer.

   ❑ 1000 mL

   ❑ 750 mL

   ❑ 500 mL

11. How many millimetres is found in a 2-metre length of timber? Tick the correct answer.

❑ 200 mm

❑ 500 mm

❑ 1000 mm

❑ 2000 mm

12. How many centimetres would be found in 2.255 metres? Tick the correct answer.

❑ 0.2255 cm

❑ 22.55 cm

❑ 225.5 cm

❑ 2255 cm

13. How many mL are there in 4.54 L? Tick the correct answer.

❑ 0.454 mL

❑ 45. 4 mL

❑ 454 mL

❑ 4540 mL

14. What does an odometer measure? Tick the correct answer.

❑ weight.

❑ distance.

❑ temperature.

Day 2

On your second day of work at Willow Bend Holiday Camp, 10 children and 10 adults come to visit. This means there is a total of 40 children and 20 adults at the camp. Ben asks you to make drinks for everyone. He also asks you to get the ingredients from the storeroom and coolroom so he can make scones.

Ben then wants you to help him put up shelves in the storeroom. He tells you that you may need to measure and cut the timber to the lengths you need.

Ben also wants to start his project to build a new play area for the children this week. He needs you to measure how much shade cloth he needs so he can order the shade cloth.

Calculations

All the tasks Ben wants you to do will require you to do calculations. You can think of these tasks as mathematical problems. To solve a mathematical problem, you will need to decide what type of calculation to do.

Calculations are what you do to work out an answer to a mathematical problem. When you are doing calculations with numbers you might have to:

- add (+)
- subtract (–)
- multiply (x)
- divide (÷).

These are called mathematical or arithmetical operations.

To solve mathematical problems, you need to understand and use the right operation.

Using mathematical language

Ben explains that it is important to read and understand the measurements and that you may also need to write the words and symbols and to talk about the different measurements as well.

Mathematical words and symbols

To do calculations and solve mathematical problems, you need to understand mathematical language – both the words and symbols. Symbols are often used instead of words in maths.

When you do calculations, different words may be used. These words may mean the same thing. Here are the symbols used for different types of calculations and some examples of different words that mean the same thing when describing calculations.

Calculation	Symbol	Words	Example
add	**+**	• plus • add • and • sum • total	• 5 plus 3 • 5 add 3 • 5 and 3 • sum of 5 and 3 • total of 5 and 3
subtract	**−**	• take away • minus • subtract • from • difference • less • less than	• 5 minus 3 • 5 take away 3 • 5 subtract 3 • 3 from 5 • difference between 5 and 3 • 5 less 3 • 3 less than 5
multiply	**X**	• multiply • times • by • lots of	• 5 multiplied by 3 • 5 times 3 • 5 by 3 • 5 lots of 3
divide	**÷**	• divide • into • how many __ in ?	• 8 divided by 4 • 4 into 8 • how many 4s in 8?

Addition

Adding is when you put two or more numbers or quantities together to make a larger number. Depending where you work, you may need to add lengths together.

Here is an example of addition:

9	+	30	= 39

9 + 30 = 39

Addition joins 9 and 30 together to make 39.

You can also say 'the sum of 9 and 30 is 39'.

You may need to use addition when you do calculations with length, weight, volume, time and temperature.

Write an addition sum

When you write an addition sum, it's important to set it out correctly. This will help you get the correct answer.

For example, if you have to add together 1.135 metres and 4.990 metres, you might set the addition sum out like this:

$$
\begin{array}{r}
1.135 \\
+\ 4.990 \\
\hline
6.125 \\
\hline
\end{array}
$$

Remember to line up the decimal points.

Example: using addition at work

Ben asks you to measure the total length of the shelves he needs in the storeroom. The purpose of this is so Ben knows how much edging he needs to buy. Edging goes on the edge of the shelf to make it look neater and make it easier to clean.

One shelf measures 3 metres and 50 centimetres long. The other shelf is 600 mm long.

First you need to calculate the total length of the shelves. You need to convert the measurements to the same unit. So you convert the 3 metres and 50 centimetres to millimetres:

- 3 m × 1000 = 3000 mm
- 50 cm × 100 = 500 mm
- So 3000 mm + 500 mm = 3500 mm

You then add the two different shelf measurements together. It looks like this when you use a calculator:

3500 + 600 = 4100

The total length of the shelves is 4100 mm for the two shelves.

The edging comes in packets of lengths: 2 m, 5 m, 10 m and 20 m. Ben needs to buy a 5 m packet of edging to cover the 4100 mm, which is the same as 4.1 m.

Subtraction

Subtracting is when you take one number away from another number or quantity, or to work out the difference between two numbers or quantities.

For example, at Willow Bend Holiday Camp, there are 15 litres of milk in the cool room. 4 litres are used at breakfast. This means there are 11 litres of milk left.

Here is an example of subtraction:

$$15 - 4 = 11$$

Subtraction takes the smaller number away from the larger number.

15 litres of milk   —   4 litres of milk   =   11 litres of milk

15	–	4	=	11

This is the same process as asking what is the difference between 15 and 11.

$$15 - 11 = 4$$

You may need to use subtraction when you do calculations with weight, length, volume, time and temperature.

Write a subtraction sum

When you write a subtraction sum, it's important to set it out correctly. This will help you get the correct answer.

For example, if you want to find the difference between 7.84 and 5.65 metres, you might set the subtraction sum out like this:

$$
\begin{array}{r}
7.84 \\
-\ 5.65 \\
\hline
2.19 \\
\hline
\end{array}
$$

Remember to line up the decimal points.

Example: using subtraction at work

The total length of the edging is 5000 mm or 5 m.

You now need to measure 600 mm and cut off that length. Before you do that you want to work out how much edging you will have left after you have cut off the 600 mm.

To work out how much you will have left you work it out like this:

- 5000 mm is the length of edging.
- 600 mm is the length of the smaller shelf.
- You subtract what you need from what you have.

It looks like this when you use a calculator:

5000 – 600 = 4400

You will have 4400 mm of edging left.

To work out how much you need to take off the length of edging to make it the right size for the longer shelf for the storeroom, you work it out like this:

- 4400 mm is the length of edging you have.
- 3500 mm is the length of the longer shelf.
- You subtract what you need from what you have.

It looks like this when you use a calculator:

4400 – 3500 = 900

This means you have a 900 mm piece of edging left.

Multiplication

Multiplication is just a quick way of adding the same amount a number of times.

For example, at Willow Bend Holiday Camp, you might need to work out how many bottles of juice you might need for three days. You use six bottles of juice each dat. That is you need to work out what 3 lots of 6 is.

6 + 6 + 6 = 18

is the same as

3 lots of 6 = 18

or

3 × 6 = 18

3	×	6	=	18
OR				
6	+	6	+	6	=	18

You may need to use multiplication when you do calculations with weight, length, volume, time and temperature.

Write a multiplication sum

When you write a multiplication sum, it's important to set it out correctly. This will help you get the correct answer.

For example, if you want to find the total weight of 8 lots of 1.7 kg, you might set the multiplication sum out like this:

$$\begin{array}{r} 1.7 \\ \times\ \ 8 \\ \hline 13.6 \end{array}$$

Division

Division is splitting or sharing an amount of something into a number of equal parts.

For example, you have 18 bottles of juice and want to share them equally between 3 groups of children. You need to work out how many bottles each group will get. This means you divide the 18 by 3. You can write it like this:

$$18 \div 6 = 3$$

Each group will get 6 bottles of juice.

Here is what 18 divided into 3 shares looks like.

18	÷	3			=	6

You may need to use division when you do calculations with weight, length, volume, time and temperature.

Write a division sum

When you write a division sum, it's important to set it out correctly. This will help you get the correct answer.

For example, if you want to divide 12.55 metres into 5 equal parts, you might set the division sum out like this:

12.55

÷   5

2.51

Put in the decimal point when you get to it.

Example: using division at work

Ben wants to make scones for the 40 children and 20 adults at the camp. He wants to serve jam and cream with the scones. To make sure there is enough for 60 scones, he asks you to work out how much jam will be needed.

Ben also asks you to work out how much jam you can put on each scone so it can be distributed evenly and also make sure there is enough jam for 60 scones. This is the purpose for working out how much jam you will need.

Jars of jam hold 500 g. You need to make sure the jam is distributed evenly, so there is enough for 60 scones.

This is how you work it out:

- You work out that each scone should have a tablespoon of jam.
- You work out that a tablespoon holds about 15 g.
- You divide the 500 g of jam by 15 g (1 tablespoon).
- 500 g ÷ 15 g = 33.3 tablespoons of jam.

That means that you can get about 30 serves of jam out of a 500 g jar. So you will need two jars of jam for 60 scones.

Solving a mathematical problem

Depending where you work, and what your tasks are, you may need to work out how to solve a problem using numbers. Some problems using numbers will include measuring.

Here are some examples.

Problem	Solution
• How many litres of milk has the camp used in the last month?	• Add the number of litres of milk for each of the last 4 weeks together.
• Ben makes tomato soup once a week when children are at the camp. There will be children at the camp for the next 4 weeks. • How much of each ingredient will you need to order so there is enough of each ingredient for the 4 weeks?	• List the ingredients and the quantities required for one meal of tomato soup. • Multiply the ingredients by the number of weeks.
• Ben then wants you to help him put a shelf in the storeroom. He tells you where the shelf is to go and where the timber is that you need to get ready for him to use. He tells you that you may need to cut the timber to the lengths you need.	• Measure the length and width of where the shelf will go. • Measure the timber. • Work out if you will need to cut the timber and, if so, where.

When you solve a mathematical problem, like these, you need to be able to:

- **understand the problem** and decide what maths to do
- **estimate** the answer. This may be a measurement or a calculation or both
- **measure** and do any **calculations** that are required. In each of the examples above, you need to do a numerical calculation
- **check your answer**
- **write and talk** about the answer; you may also need to talk about how you measured and did the calculation.

Understanding the problem

To understand the problem, you need to decide what the end result should be. For example, you want the timber to be the right length for the shelf Ben wants built in the storeroom. You need to think about the type of measurement or calculation that needs to be done. This may include reading numbers and maths symbols and words.

You may need to think about whether there are different steps you need to do. For example, do you need to measure first and then do a calculation, can you just measure or do you need to do a calculation and then measure? Imagine that you need to make cordial for 60 people. You know how much cordial and water to mix together for 20 people. To work out how much water and cordial you will need, you have to calculate how much cordial and water you will need and then measure the amounts.

If you need to measure, you will need to think about which equipment is best for the task. For example, to measure where the shelf needs to go, you know a tape measure will be the best tool to use.

Estimating before a calculation

Before you measure or do a calculation, think about what sort of answer you expect to get by doing a rough estimate.

An estimation is an approximation or educated guess. An educated guess is a guess based on knowledge and experience rather than just a number you think may be right.

You do this by doing a quick and rough estimate of the measurement and calculation to get an idea of what the answer should be. It is not an accurate answer — just a rough estimate.

Usually, you round off the numbers or measurements into easier, simpler numbers, so that you can add, subtract, multiply or divide the numbers in your head or quickly with a pen and paper.

You may use estimations to measure:
• length
• weight
• capacity
• temperature
• time.

When you are estimating length, it's helpful to use your body.

Some body measurements	
1 metre	• a big pace • from the ground up to about your waist • from the tip of your fingers on your outstretched arm to your chin.
1 cm: a fingernail	• one fingernails is about 1 cm (or 10 mm) across.
20 cm: your handspan	• your handspan is about 20 to 25 cm (or 200 – 250 mm). • To find your your handspan, stretch out your hand and measure the distance from your little finger across to your thumb.

Examples of estimations

Here are examples of things you can make estimations about.

Length

Example of estimation:

I need to estimate how far it is around the new play area as I want to know if we may have enough fencing in the shed. I pace around the area and it's 38 paces. One pace is just under 1 metre. We only have 20 metres of fencing in the shed, so it's not enough.

Weight

Example of estimation:

The recipe for a batch of 12 muffins uses 260 g flour. So, I estimate that for 48 muffins I will need just over 1 kg of flour.

Volume

Example of estimation:

When I made the coleslaw yesterday, I used a 1-litre jug to measure the mayonnaise. I filled it less than half way with the mayonnaise. Today I am making twice as much coleslaw, so I know the jug will hold the amount I need today.

Temperature

Example of estimation:

Yesterday when I heated food in the oven, it took about 20 minutes for the food to get hot. Today the food is very cold, so I think it will take about 30 minutes for the food to heat up.

Measuring

When you measure at work, you need to be accurate. Depending on what you are measuring you will use different measuring equipment. You learnt about some measuring equipment on Day 1.
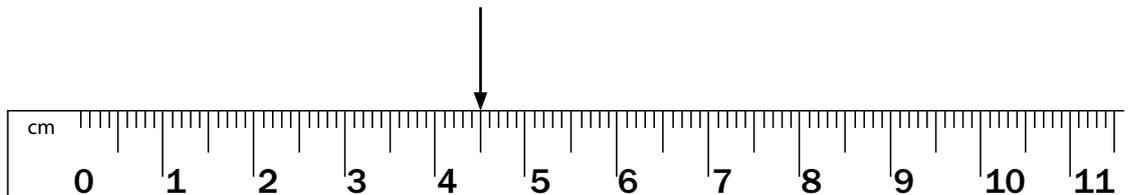
To make sure you can measure accurately, you need to practice.

While this resource explains how to measure length, weight, volume and temperature, the best way to learn to measure is by finding different measuring tools and making real measurements.
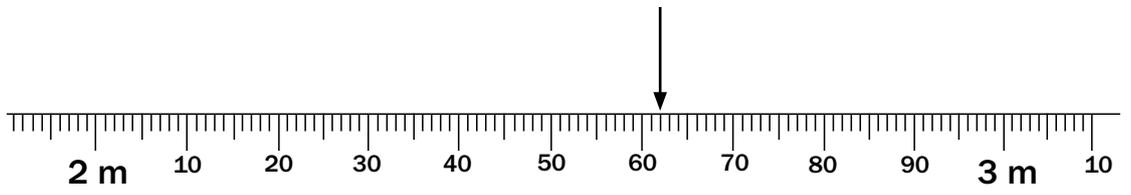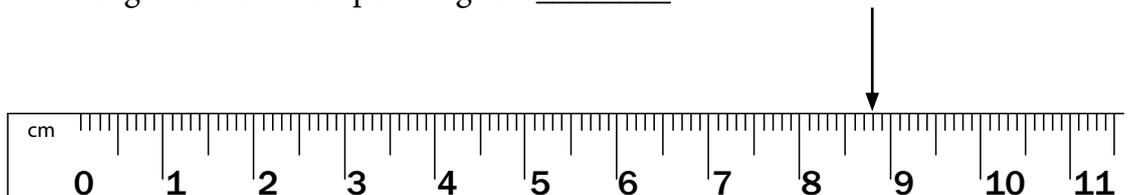
Measuring length

The image below is of part of a ruler. It has millimetres and centimetres marked on it. The smallest divisions are the millimetres and the numbers show the centimetres. The arrow is pointing to 45 millimetres or 4 centimetres and 5 millimetres or 4 ½ centimetres.
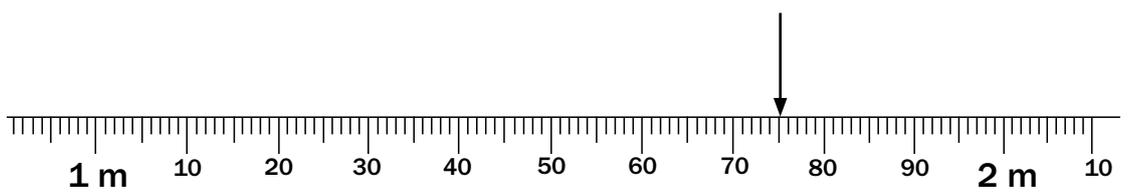
The image below is a part of a tape measure. It has been reduced in size. The part of the tape measure in the image, starts at 2 metres and goes to just over 3 metres. The small numbers show the centimetres. The arrow is pointing to 2 metres and 62 centimetres.

Look at the image of part of a ruler. Using millimetres, what length is the arrow pointing to? _____

Look at the image of part of a tape measure. The image has been reduced in size. What length is the arrow pointing to? _____

Use a tape measure or a ruler to measure the page in this resource. Write it twice: one in millimetres and once in centimetres and millimetres.

|	**Millimetres**	**Centimetres and millimetres**
Width		
Length		

Use a tape measure to measure the size of the top of the table you are working on. Write it using two different units, for example millimetres, centimetres and/or metres. Write the correct abbreviation for the unit after the measurement. Also work out the perimeter of the table which is the total distance around the outside of the table.

	Millimetres	**Centimetres and millimetres**
Width		
Length		
Perimeter		

Measuring weight

At Willow Bend Holiday Camp, you need to measure weight when you are getting the ingredients ready for Ben to make the food for the children and staff. You need to be accurate with weighing these items.

This image shows an analogue scale. The scales show the bowl weighs 3 kilograms and 500 grams or 3500 grams.
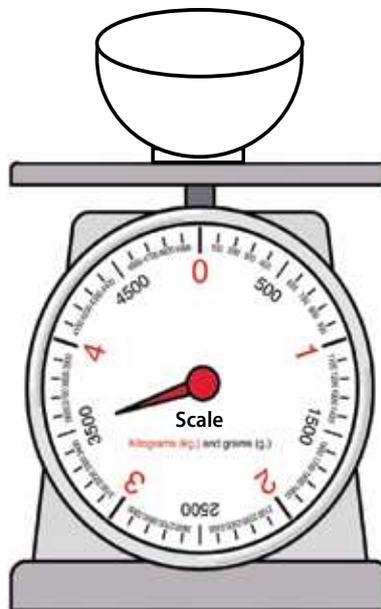
This image shows a digital scale. The scales show the lemons weigh 769 grams.

Look at the scales below. How much do the mangoes weigh?

_____

Look at the picture of the analogue scale.

How much does the bag weigh? _____
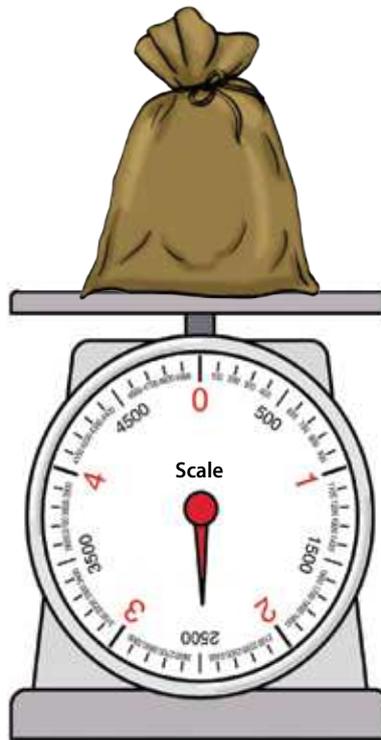
Use some scales to measure an object. Make sure you weigh it accurately.

What did you weigh? _____
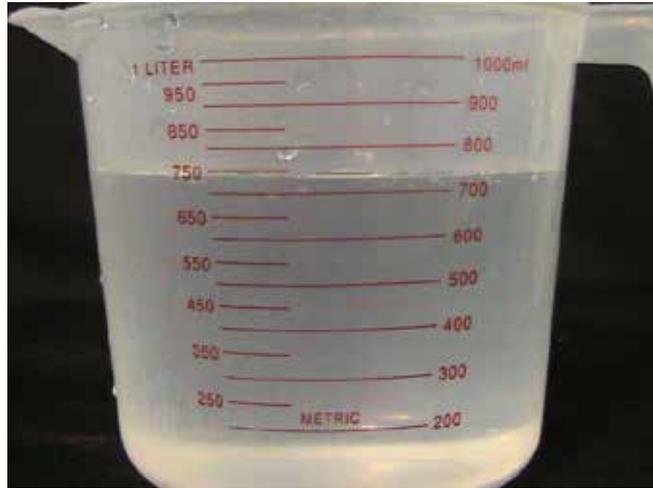
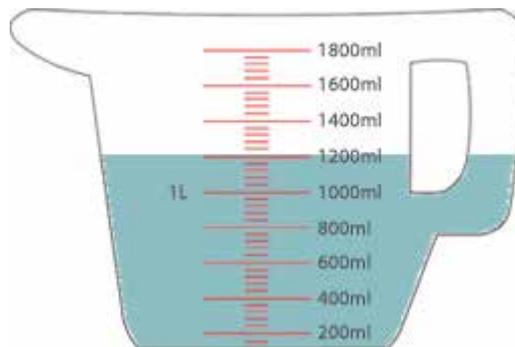What type of scales did you use? _____

How much did it weigh? _____

Measuring volume

At Willow Bank Holiday Camp, one of your jobs is to mix up the cordial for the children. You have to measure the volume of water and cordial for their drinks.

This image of a jug shows the millilitres. The jug takes 1000 mL or 1 Litre. This jug contains nearly 750 mL of water.

Look at the image below of a jug. How much liquid is in the jug?

_____

Look at the jug below. You want to measure 300 mL of milk.
Draw a line on the jug below showing where you would fill
it up to.

Use one of the measuring tools you learnt about in Day 1 to
measure a quantity of liquid. Make sure you measure accurately.

What did you use to measure the liquid? _____

What did you measure? _____

How much did you measure? _____

Measuring temperature

At Willow Bend Holiday Camp, there is a thermometer in the coolroom. The coolroom is where the milk, fruit and vegetables are stored to keep them cold. You need to read the temperature of the coolroom twice a day and record the temperature readings in the logbook. The temperature in the coolroom needs to be at 5^0C or less. This thermometer is showing the temperature in the coolroom is 2.3^0C, therefore the temperature in the coolroom is cold enough.

Ben also sometimes asks you to check the temperature of the food that's cooking. Food needs to be cooked at a high enough temperature to make sure it is safe to eat. Ben is cooking chicken. Chicken needs to reach 75°C to be fully cooked. This is the probe thermometer you use to tell if the food in the chicken is cooked. The temperature is showing the chicken is 66.1^0C so it isn't cooked yet.

Willow Bend Holiday Camp also has a policy of what to do if the air temperature gets over 36^{0}C. If it gets over 36^{0}C, you need to keep the children inside and do quieter activities. There is a bulb thermometer just outside the storeroom. The thermometer shows the temperature is 31^{0}C, which is warm but not hot enough for the children to come inside for activities.
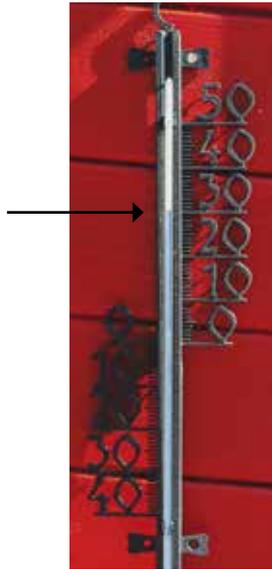
Look at the bulb thermometer below.

What temperature is it showing? _____

Below is a different sort of probe thermometer.

What temperature is it showing? _____

Do you need to measure temperature at work?

❑ Yes

❑ No

If yes, measure the temperature and fill in the box below.

What I took the temperature of: _____

The temperature was: _____

Tool used to take the temperature: _____

We need to take the temperature because: _____

_____

If you don't need to measure temperature at work, use a thermometer to measure the temperature of something at home. This might be your temperature, the air temperature or the temperature of food. Fill in the box below.

What I took the temperature of _____

The temperature was: _____

Tool used to take the temperature: _____

We need to take the temperature because: _____

_____

Calculating your answers

Sometimes, you will need to make calculations based on information you have, such as a recipe, or using the measurements you have made.

People do calculations in different ways. You can:

- do them in your head

- use a pen and paper

- use a calculator.

And you can do it all three ways if you like — this would make sure you got it right!

Working a sum out in your head

Some calculations can be done in your head. This means you can do the calculation without writing it down.

Some people can do calculations quickly and easily in their heads and they use lots of different ways and short cuts to do this. It's more common to do adding and taking away in your head, than multiplying and dividing, and it all depends on the size of the numbers you are working with too.

For example, you have 2 pieces of timber each 2.4 m long. You want to know if you have enough timber for the shelf. The shelf needs to be 3.5 m. You add the 2.4 + 2.4 and you get 4.8. You know you have enough timber for the shelf.

You can work out the amount in your head because you know that 2.4 + 2.4 is 4.8.

Using a pen and paper

For some calculations, you may need to use a pen and paper. For example, a customer may order 10 bags of groceries and want them delivered. This means you need to calculate the cost of the groceries, and add on how much it costs for you to deliver the groceries to them.

There are lots of different ways to calculate using a pen and paper. Do your calculations your way — whatever works best for you. Talk to your trainer or supervisor if you don't know how to do calculations.

In the section about adding, subtracting, multiplying and dividing, there were some examples of calculating using pen and paper:

1.135 + 4.990 __6.125__	7.84 − 5.65 __2.19__	17 x 8 __136__	12.55 ÷ 5 __2.51__

For some measurements it may be helpful to draw a diagram. For example, you may want to draw a diagram of the shelf showing the length and the width of it and where the supports for the shelf will go.
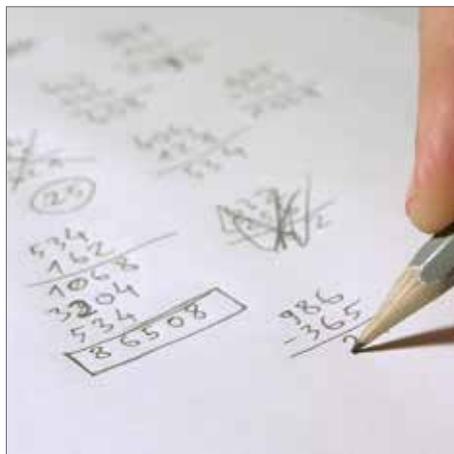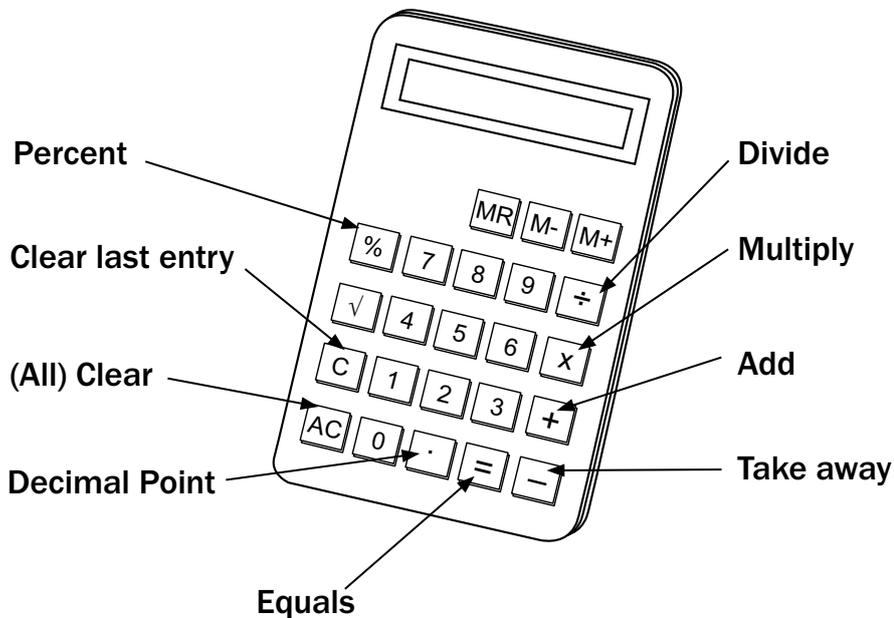
Using a calculator

You can also use a calculator to work out (calculate) your answers.

A calculator is a great tool to use — it helps to do calculations quickly and accurately. The main problem with using a calculator is making sure you know how to use one properly and to check your answer.

Below is a picture of a calculator showing you the buttons you will mainly use.

Percent

Divide

Clear last entry

Multiply

(All) Clear

Add

Decimal Point

Take away

Equals

The following table describes common symbols used on a calculator.

Operation	Button	Meaning
Add	**+**	Adds the next number to what you have already entered in the calculator
Divide	**÷** or **/**	Divides the next number into to what you have already entered in the calculator
Multiply	**X** or ***	Multiplies the next number to what you have already entered in the calculator
Take away	**–**	Takes away or subtracts the next number from what you have already entered into the calculator
Percent	**%** or **%±**	Works out a percentage for you
Clear last entry	**C** or **CE**	Clears from the screen just the last number you entered — means that if you made a mistake when you entered the number, you can change it without deleting any previous numbers and operations you entered.
(All) Clear	**C** or **AC**	Clears everything from the calculator.
Decimal Point	**•**	The point that separates the whole number part from the fraction part of a number.
Equals	**=**	Pressing the = (equals) button shows you what the answer is to the calculation.

For several reasons, calculators can be wrong, so don't trust them completely — you should always check your answers.

Adding, subtracting, multiplying and dividing using a calculator

The section on the different operations, showed you how to set out sums using pen and paper. When you use a calculator, you need to press the buttons in the correct order to get the right answer.

Below are some examples.

Adding

If you have to add together 1.135 metres and 4.990 metres, on a calculator you would press the buttons in the following order:

1	.	1	3	5	+	4	.	9	9	0	=

The answer should then show on the screen as:

6.125

The sum of 1.135 metres and 4.990 metres is 6.125 metres.

Subtracting

If **you want to find** the difference between 7.84 and 5.65 metres, on a calculator you would press the buttons in the following order:

7	.	8	4	–	5	.	6	5	=

The answer should then show on the screen as:

2.19

The difference between 7.84 and 5.65 metres is 2.19 metres.

Multiplying

If **you want to find the** total weight of 8 lots of 17 kg, using a calculator you would press the buttons in the following order:

1	7	x	8	=

The answer should then show on the screen as:

136

The total weight of the 8 lots is 17 kg is 136 kg.

Dividing

If **you want to divide 12.55 metres into 5 equal parts**, using a calculator you would press the buttons in the following order:

1	2	.	5	5	÷	5	=

The answer should then show on the screen as:

2.51

12.55 metres divided by 5 is 2.51 metres.

Checking measurements and calculations

When you finish measuring or making a calculation, it is important to check that the answer is correct.

When you do calculations either with a pen and paper or a calculator, there are some important things to consider. Calculators (or you and your pen and paper) can sometimes give you the wrong answer — for example, you may have made a mistake in how you put in the number into the calculator or when you wrote down the numbers.

So you should always check your answers after you have worked them out. You can do two things to check.

- Check your answer against your initial estimate. It should be similar or pretty close.

- Think about whether your answer seems correct and reasonable. Use your prior knowledge and experience and common sense to think about whether the number or measurement seems about right for the situation or does it seem to be way too high or low.

For example, at Willow Bank Holiday Camp, Ben wants to make scones for the children and adults at the camp and the visitors. Yesterday, Ben made scones for the 30 children and 10 adults at the camp. Today, he wants to make scones for an extra 10 children and 10 adults. He will need to make 60 scones so they can each have one scone. Yesterday he used 910 g of self raising flour so you got a 1 kg bag of self raising flour from the storeroom.

You estimate Ben will need ½ as much again as he used yesterday so today you will get 1 ½ kg from the storeroom. When you calculate the exact amount required it is 910 g + 455 g which equals 1kg and 365 g. This is close to your estimate and seems about right.

Depending on the task, checking the accuracy of a measurement or calculation can be very important. For example, it's important to know how long food has been at the right temperature for. If it hasn't been at the right temperature for long enough, it may be unsafe to eat.

Calculating area

At Willow Bend Holiday Camp, Ben asks you to work out how much shade cloth he needs to cover the new play area. Area is the amount of flat space inside a closed border or edge, for example, the park, circular garden wall of a room:

A park

A circular garden bed

The wall of a room

Area is measured in **square metres**. This is abbreviated to **sq m** or **m²**.

One **square metre** equals the area of a square 1 metre wide by 1 metre long.

1 m

Area = 1 square metre (m²)

1 m
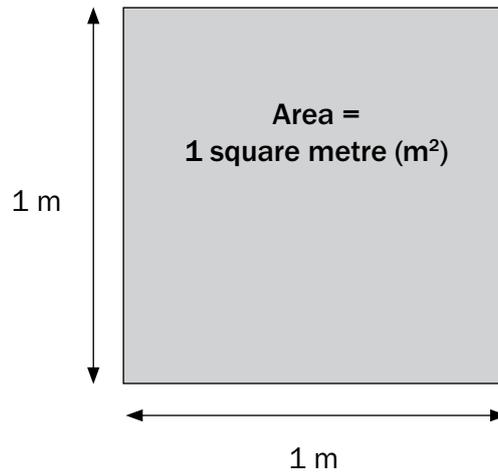
To work out how much shade cloth is needed to cover the play area, you need to work you how many square metres (m²) the area is.

# Calculating the area of squares and rectangles

The area of the play area is rectangular. A rectangle has four straight sides that all meet at right angles. A square is a particular type of rectangle where all the four sides are the same length.
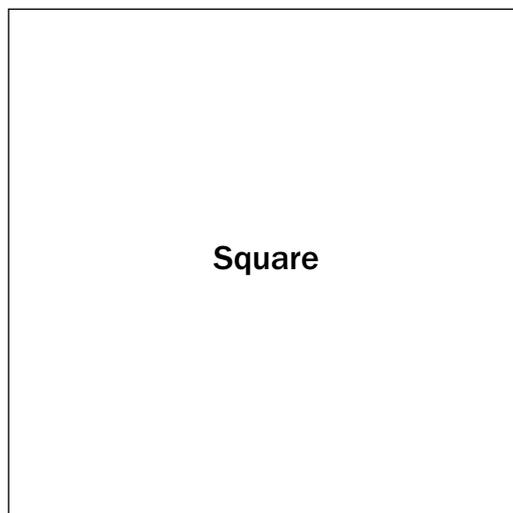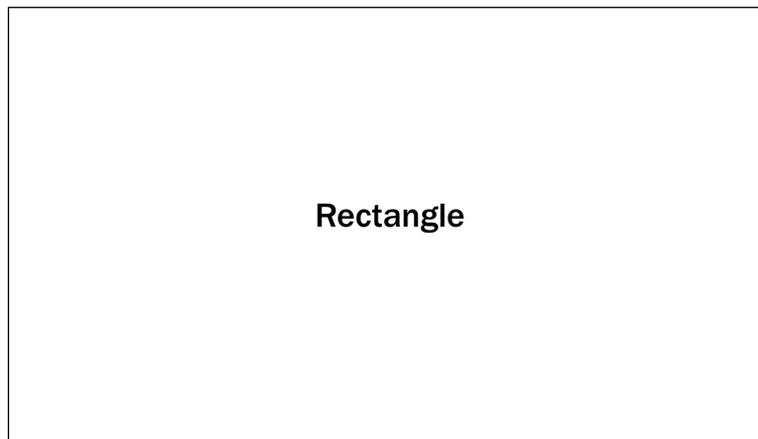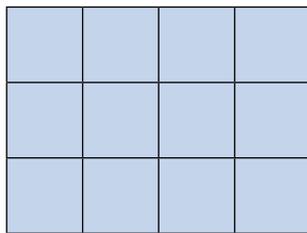
Rectangle

Square

A formula to calculate the area of a rectangle or square

There is a formula to work out the area of a rectangle or square.

The first rectangle is 4 cm long by 2 cm wide. If you count the squares (each square is 1 cm x 1 cm) you can see that the total area of the rectangle is 8 square centimetres. You write this as 8 cm^2.
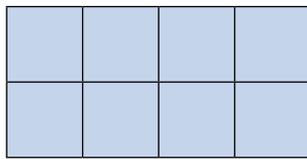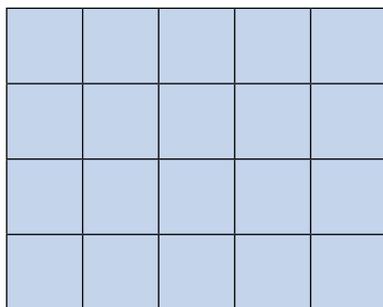
Area = 4 cm long by 2 cm wide
= 4 x 2 = 8 square cm (cm^2)

This rectangle is 4 cm long and 3 cm wide. This time the area is:
Area = 4 cm long by 3 cm wide
= 4 x 3 = 12 square cm (cm^2)

This rectangle is 5 cm long and 4 cm wide. This time the area is:
Area = 5 cm long by 4 cm wide
= 5 x 4 = 20 square cm (cm^2)

The number of squares, or the **area**, is the same as **multiplying** the length by the width.

You can therefore write a formula for working out the area of a rectangle:

- Area equals the length multiplied by the width.
- Area = length x width.

Maths has a shorthand way of writing things down by using:

- the first letters of the key words, e.g. A for Area, L for length and W for width
- symbols for maths operations, e.g. = for equals, x for times or multiplied, etc.

We therefore write the **formula** for the area of a rectangle as:

$$A = L \times W$$

Width, W

Length, L
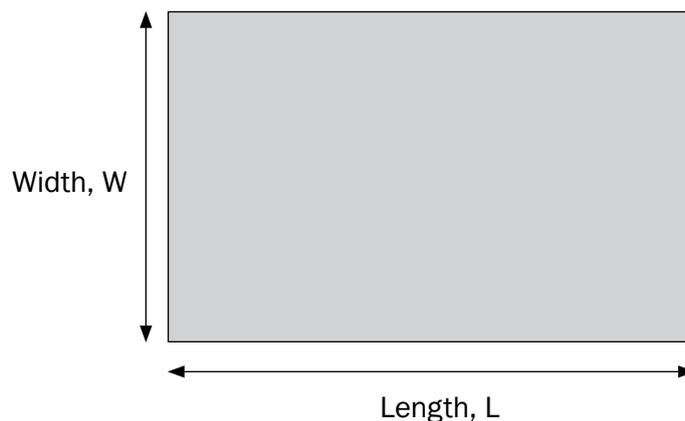
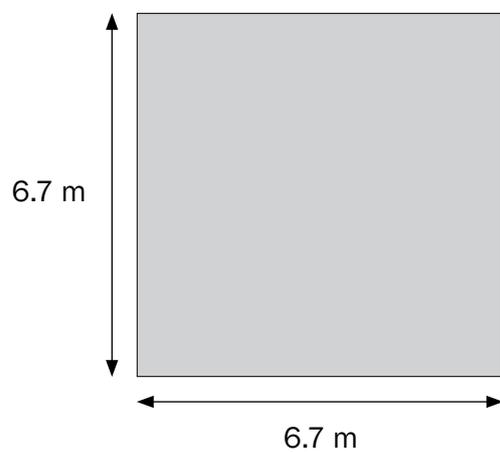| Key Point - Units for Area |
|---|
| The units used for **area** are:
• square millimetres (sq mm or mm^2).
• square centimetres (sq cm or cm^2).
• square metres (sq m or m^2).

When calculating areas, the units should be the **same** for each side of the area you are measuring. That means they need to be all millimetres, or all centimetres or all metres. If a side is both metres and centimetres, you would make it all centimetres or a decimal fraction of a metre. |

Calculate area: some examples

Area = L x W

= 11.9 m x 3.6 m

= 42.84 sq m or m^2

3.6 m

11.9 m

Area = L x W
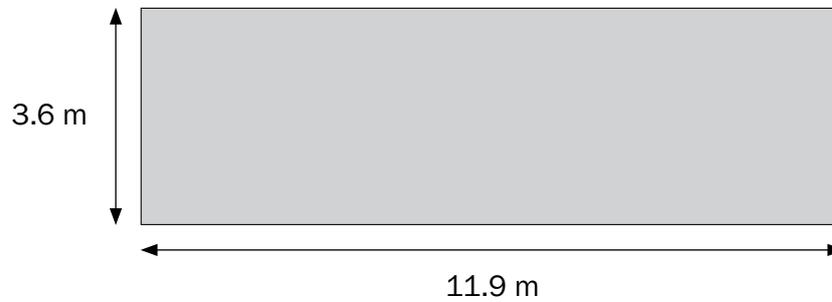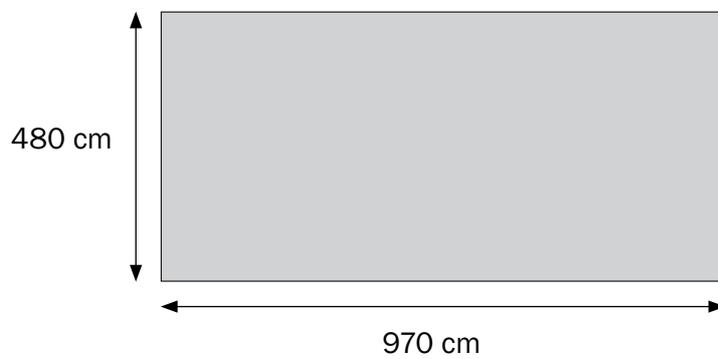
= 480 cm x 970 cm

= 465,600 cm or 46.56 m

480 cm

970 cm

Area = L x W

= 6.7 m x 6.7 m

= 44.89 m

6.7 m

6.7 m

84

Calculate the amount of shade cloth required: Understand the problem

First make sure you know which area needs to be covered by shade cloth.

Decide which equipment will be best for the task. You found out about some measuring equipment on Day 1.

You decide a tape measure would be the best tool for this task. It has millimetres, centimetres and metres marked on it. It will give accurate measurements for the size of the play area.

Calculate the amount of shade cloth required: Estimate the lengths

First, pace out the length and width of the play area. When you step out the area, it gives you an estimation of the length and width of shade cloth that Ben needs to order. Remember it needs to be a big pace in order to be close to 1 metre.

The length is 11 paces which equals about 11 metres, although it's probably a bit less as your pace is likely to be a bit less than 1 m.

$$11 \times 1 \text{ m} = 11 \text{ m}$$

The width is nearly 8 paces which equals about 8 metres.

$$8 \times 1 \text{ m} = 8 \text{ m}$$

This tells you that the area is approximately

A = L x W

A = 11 $\times$ 8 = 88 m² approximately.

Calculate the amount of shade cloth required: Measure the lengths

Once you have an estimation of the length and width, you can measure accurately.

When you measure the length and width you find:

- Length: 10 m 40 cm
- Width: 7 m 50 cm

When you compare the actual measurement to your estimation, you find your estimate was very close.

	Estimate	Accurate measurement
Length	A bit under 11 m	10 m 40 cm
Width	A bit under 8 m	7 m 50 cm

Calculate the amount of shade cloth required: Calculate the area

To work out the area the shade cloth needs to cover, the units must be the same. That is all centimetres or all metres. Because shade cloth is sold by the metre, you turn the measurements into metres.

- Length 10 m 40 cm = 10.4 m
- Width 7 m 50 cm = 7.5 m

To work out how many square metres of shade cloth Ben needs to order, multiply the length by the width – L x W

$$10.4 \times 7.5 = 78 \text{ m}^2$$

You round this up to 80 m^2. You think you will need a bit extra for seams and wastage so you add on another 10%. 10% of 80 is 8. You add this to 80 m^2 which is 88 m^2.

You tell Ben that he needs to order 88 square metres of shade cloth for the new play area at Willow Bend Holiday Camp.

Communicating mathematical information

In a workplace, it is important to record and communicate the results of calculations clearly and correctly. You may also need to explain the process you used to get the results. To do these, use the mathematical language that is used in your workplace.

Depending on where you work, there may be specific words to communicate numerical information and results.

Formal and informal maths language

Sometimes, you will need to understand formal maths language to read, write or talk about numbers and calculations (e.g., plus, difference, multiply, divide). Other times, you may use informal language (e.g., total, from, lots of, into). You will also need to understand formal maths symbols (e.g., +, −. ×, ÷).

Depending on where you work, there may be formal words related to the maths that you might need to learn about and use. For example, if you work in a retail setting, you may record sales results in a report using formal language, such as 'loss and gain', instead of informal language, such as 'the sales were up' and 'the sales were down'.

For example:

Formal maths language	Informal maths language
Last month, the store had a loss of $15,000.	Last month, sales were down by $15,000.
The expected gain for next month is $25,000.	We expect sales to be up by $25,000 next month.

You may also need to use words like increase and decrease if you are recording workplace information using percentages.

For example:

Formal maths language	Informal maths language
There was a 20% increase in sales.	Sales were up by a fifth.
The 50% decrease in customers last month was due to the store being renovated.	Customers were down about half last month because the store was being renovated.

You often use formal maths language when you write and informal maths language when you talk.

What has happened on Day 2

On your second day of work at Willow Bend Holiday Camp, you have learned about:

- maths words and symbols
- making calculations – adding, subtracting, multiplying and dividing
- solving mathematical problems
- estimating
- measuring
- checking calculations
- calculating area
- formal and informal language.

Learning Checkpoint Day 2

1. What does the symbol '×' mean on a calculator?
    Tick the correct answer.

    ❑ Plus.

    ❑ Divide.

    ❑ Multiply

2. Which of the following is an example of subtraction?
    Tick the correct answer.

    ❑ $75 + 5 = 80$

    ❑ $75 × 5 = 375$

    ❑ $75 ÷ 5 = 15$

    ❑ $75 − 5 = 70$

3. What calculation would you use to distribute a quantity
    evenly? Tick the correct answer.

    ❑ Division

    ❑ Addition

    ❑ Multiplication

    ❑ Subtraction

4. You have 2 litres of milk. You need to share the milk evenly
    between 8 people. How many mL will each person get?
    Tick the correct answer.

    ❑ 500 mL

    ❑ 250 mL

    ❑ 200 mL

5. What's the first thing you should do when you have a maths problem than includes measuring? Tick the correct answer.
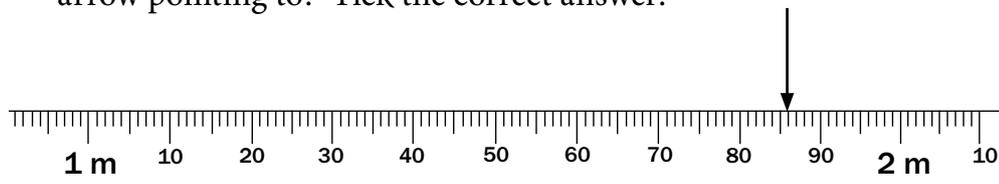
❑ Measure and calculate the answer

❑ Estimate the measurement

❑ Check your answer

❑ Understand what the problem is and decide what you need to measure

6. What is one good way to estimate distance?
Tick the correct answer.

❑ Step it out

❑ Use a measuring tape

❑ Use a trundle wheel

7. Look at the image of a tape measure. What length is the arrow pointing to? Tick the correct answer.

❑ 86 mm

❑ 86 cm

❑ 1 metre and 80 centimetres

❑ 186 cm

8. A bag of flour is placed on a set of scales and weighs 2 ½ kgs.
How many grams would this convert to?
Tick the correct answer.

❑ 250 g

❑ 2500 g

❑ 25 g

❑ 2.5 g

9. You buy five rolls of weed mat for the play area. Each roll is 7.5 metres long. Which buttons would you press on the calculator to work out the total length? Tick the correct answer.

❑ | 7 | . | 5 | – | 5 | = |

❑ | 7 | . | 5 | + | 5 | = |

❑ | 7 | . | 5 | x | 5 | = |

❑ | 7 | . | 5 | ÷ | 5 | = |

10. You want to measure 0.25 L of milk in a jug. How many millilitres is this? Tick the correct answer.
    ❑ 25 mL
    ❑ 2500 mL
    ❑ 0.25 mL
    ❑ 250 mL

11. 205 gHow can you check an answer to see if it is correct? There are two correct answers. Tick the correct answer.
    ❑ guessing
    ❑ doing the calculation again
    ❑ checking the answer against your estimate
    ❑ thinking about whether the answer makes sense.

12. Which formula shows how to calculate the area of a rectangle? Tick the correct answer.
    ❑ A = L + W
    ❑ A = L – W
    ❑ A = L x W
    ❑ A = L ÷ W

13. How much shade cloth would you need to cover an area 8 m by 8 m? Tick the correct answer.

☐ 8 m²

☐ 16 m²

☐ 64 m²

☐ 640cm²

14. To complete some landscaping work at the camp, you need to buy five bags of potting mix and 10 plants. The potting mix costs $5.50 a bag and the plants are $12.50 each.

What steps do you need to do to work out the total amount it will cost? Write and record your calculation method and answers in the table below.

Step	Calculation method	Answer
1		
2		
3		

15. You are told that the cost of supplies are up by 10%. What type of language has been used? Tick the correct answer.

☐ Formal

☐ Informal

16. Refer to the previous two questions.

    Your supervisor asks you to explain how you calculated the cost of the potting mix and plants. Which of the following would best communicate to her how you worked out the cost? Tick the correct answer.

    ❑ I added the costs together for a sum of $152.50.

    ❑ I multiplied the number of each item by the cost of each item, and then multiplied them again by two and got a total $152.50

    ❑ I multiplied $5.50 by 5 and that comes to $27.50. One plant costs $12.50 and you needed 10. $12.50 by 10 comes to $125. I added the two amounts together for a sum of $152.50.

What you have learned

Well done. While working at Willow Bend Holiday Camp, you have learned about:

- identifying and interpreting measurements

- units of measurement

- converting units of measurement

- measuring equipment

- selecting and using measuring equipment.

- maths words and symbols

- making calculations - adding, subtracting, multiplying and dividing

- solving mathematical problems

- estimating

- measuring

- checking calculations

- calculating area

- formal and informal language.

 You are now ready for the Final Assessment.