Numeracy Skills Level 3

Welcome

This book covers some basic skills that will come up in the course you have enrolled in.

It is here to help you understand some of these skills to make your new course easier.

There are examples with activities for you to practice each skill, and to help you remember how to do each thing.

Remember: This is not a test.

Take your time and ask for help from family, friends or your trainer if you need it.

Don’t worry if you can’t finish something, but try your best.

Don’t forget your trainer can help with any activities you are unsure of.

Contents

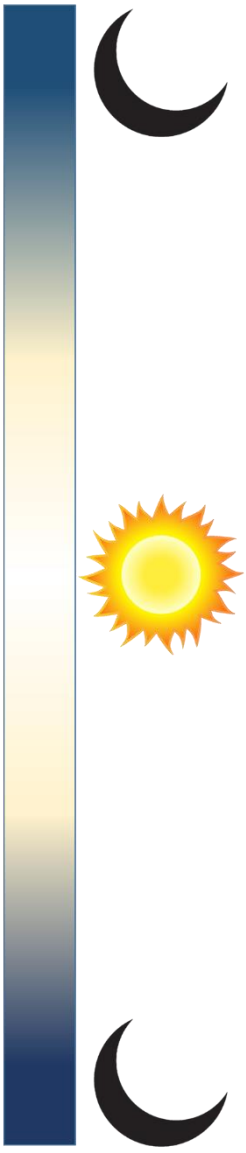
Lesson 3.1 Twenty Four Hour Time

24-hour time is used by the army, navy and airlines to tell the time without using AM/PM.

There are 24 hours in each day so 24-hour counts up past 12. This is different to 12-hour time, which repeats 12 hours for AM and PM.

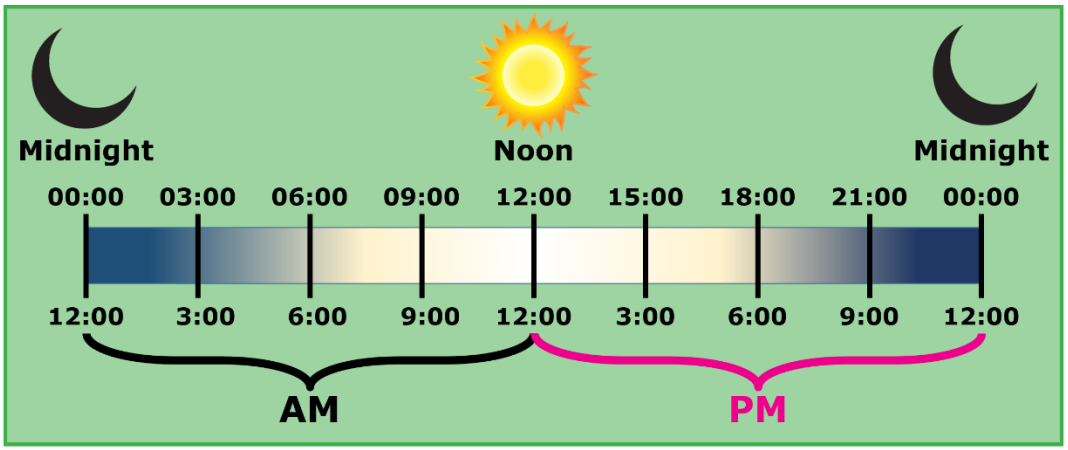
This table shows how 12-hour time is written as 24-hour time:

12-hour time	24-hour time
1:00 am	01:00
2:00 am	02:00
3:00 am	03:00
4:00 am	04:00
5:00 am	05:00
6:00 am	06:00
7:00 am	07:00
8:00 am	08:00
9:00 am	09:00
10:00 am	10:00
11:00 am	11:00
12:00 noon (pm)	**12:00**
1:00 pm	13:00
2:00 pm	14:00
3:00 pm	15:00
4:00 pm	16:00
5:00 pm	17:00
6:00 pm	18:00
7:00 pm	19:00
8:00 pm	20:00
9:00 pm	21:00
10:00 pm	22:00
11:00 pm	23:00
12:00 midnight (am)	**00:00**



Converting 12-hour time to 24-hour time

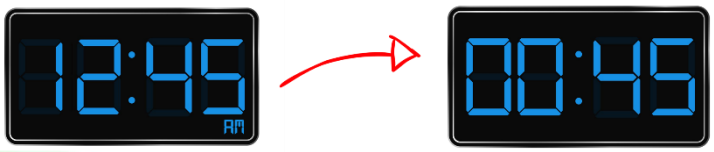
To change 12-hour time to 24-hour time you only need to change times from midday to midnight – the PM half of the day.



From 1:00 PM to 11:00 PM all you need to do is **add 12** to the time:

PM Time	+ 12 Hours	24-Hour Time
1:00 pm	+ 12:00 =	13:00
2:00 pm	+ 12:00 =	14:00
3:00 pm	+ 12:00 =	15:00
4:00 pm	+ 12:00 =	16:00
5:00 pm	+ 12:00 =	17:00
6:00 pm	+ 12:00 =	18:00
7:00 pm	+ 12:00 =	19:00
8:00 pm	+ 12:00 =	20:00
9:00 pm	+ 12:00 =	21:00
10:00 pm	+ 12:00 =	22:00
11:00 pm	+ 12:00 =	23:00

12:00 midnight goes back to zero like this 00:00.
So 12:45AM is 00:45 in 24-hour time.



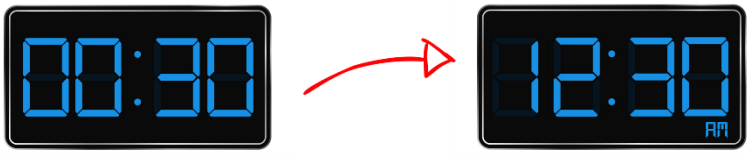
Converting 24-hour time to 12-hour time

Once again, to change 24-hour time to 12-hour time you only need to change times from midday to midnight – the PM half of the day.

From 13:00 to 23:00 all you need to do is **subtract 12** from the time:

PM Time	- 12 Hours	12-Hour Time
13:00	– 12:00 =	1:00 pm
14:00	– 12:00 =	2:00 pm
15:00	– 12:00 =	3:00 pm
16:00	– 12:00 =	4:00 pm
17:00	– 12:00 =	5:00 pm
18:00	– 12:00 =	6:00 pm
19:00	– 12:00 =	7:00 pm
20:00	– 12:00 =	8:00 pm
21:00	– 12:00 =	9:00 pm
22:00	– 12:00 =	10:00 pm
23:00	– 12:00 =	11:00 pm

00:00 goes back to 12:00 AM (midnight).
So 00:30 is 12:30 AM in 12-hour time.



Activity 3.1

1. Convert the **12-hour times to 24-hour times**:

12-hour time	24-hour time	12-hour time	24-hour time
a) 2:55 PM		b) 12:50 PM	
c) 6:15 AM		d) 6:05 AM	
e) 7:00 PM		f) 8:59 PM	
g) 9:25 PM		h) 11:40 AM	
i) 12:10 AM		j) 1:17 AM	

2. Convert the **24-hour times to 12-hour times**. Don't forget to include AM/PM!

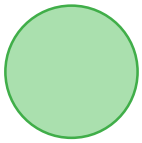
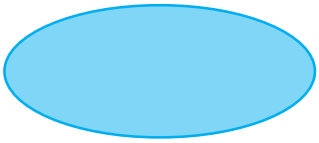
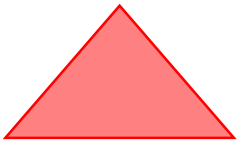
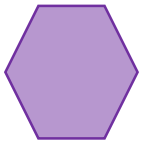
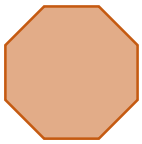
24-hour time	12-hour time	24-hour time	12-hour time
a) 14:25		b) 13:00	
c) 11:24		d) 00:29	
e) 07:15		f) 05:55	
g) 12:30		h) 03:25	
i) 22:45		j) 16:05	

Lesson 3.2 Shapes

There are shapes all around us.

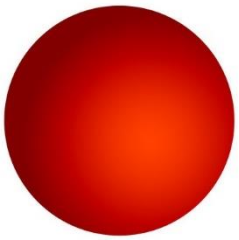
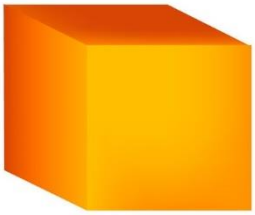
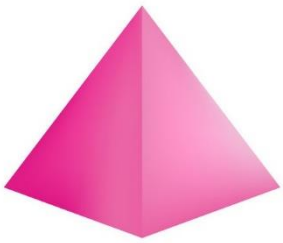
Simple shapes, called **2-Dimensional** (or 2D) are flat. This means they only have 2 dimensions that are **length** and **width**. They do not have any height or depth.

Here are some **2D shapes**:

Circle		A perfectly round shape.
Oval		A stretched circle
Square		A shape with 4 sides that are all the same length
Rectangle		A shape with 4 sides, where 2 sides are longer and 2 sides are shorter
Triangle		A shape with 3 sides
Hexagon		A shape with 6 sides that are all the same length
Octagon		A shape with 8 sides that are all the same length

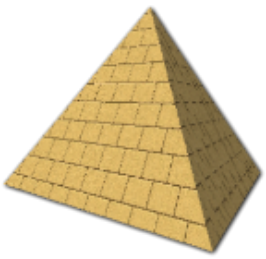
3-Dimensional (or 3D) shapes are made up of **length**, **width** and **height** (or depth).

Here are some **3D shapes**:

Sphere		A round object like a ball.
Cube		A 6 faced square where all sides are the same length, like a dice.
Cone		A shape that has a circle shape at one end and a point at the other end. Think of an ice cream cone.
Pyramid		A shape can have 3 or 4 sides of triangles that come together into a point. Think of the pyramids in Egypt.
Cylinder		A shape that has a circle shape at both ends like a tin can or a pipe.

Activity 3.2

1. Write the name of the shape under the picture:

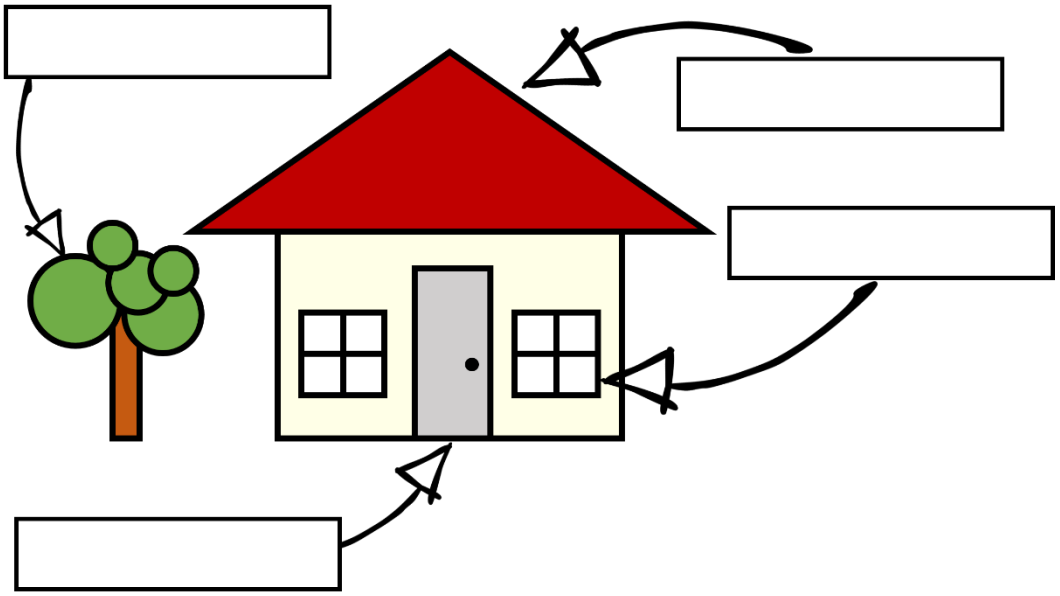
		
a)	b)	c)
		
d)	e)	f)
		
g)	h)	i)

2. Draw the shapes:

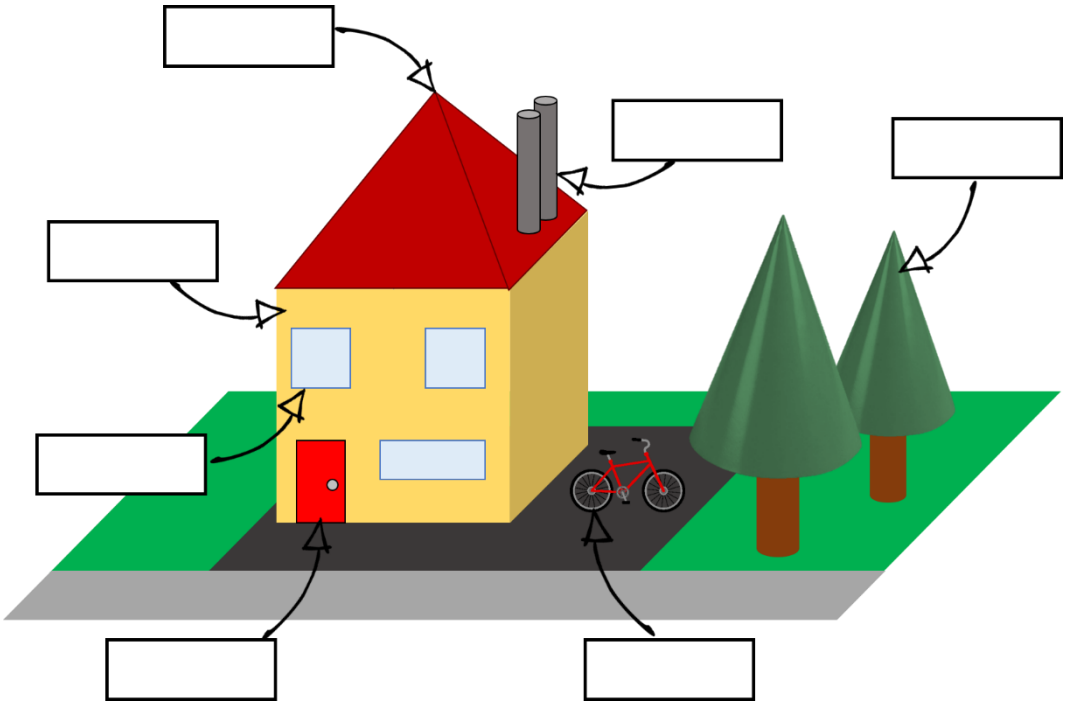
a) Square	b) Circle	c) Triangle
d) Rectangle	e) Pyramid	f) Cube
g) Cylinder	h) Hexagon	i) Cone

3. List the shapes that you can see in the pictures:

a)



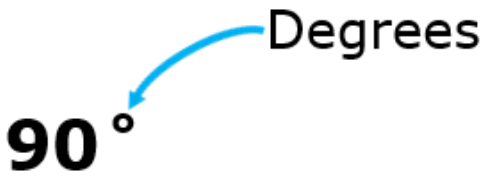
b)



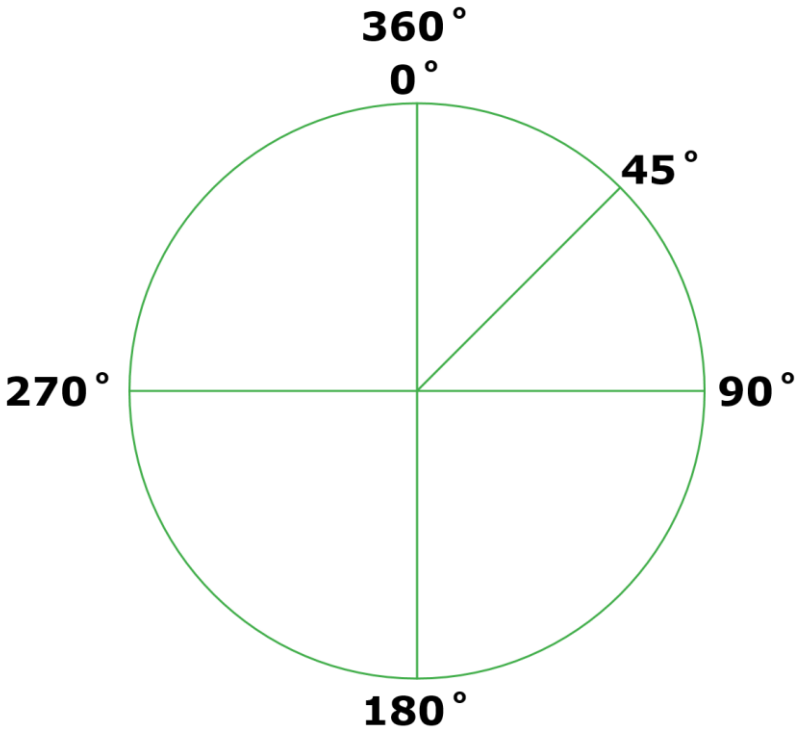
Lesson 3.3 Angles

Angles measure the amount of a turn or rotation.

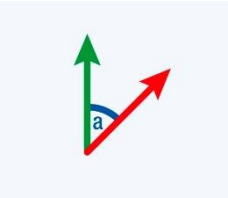
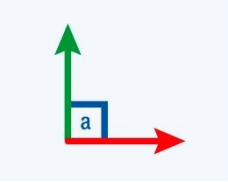
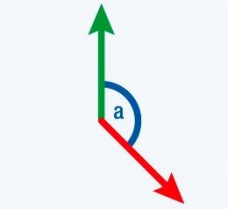
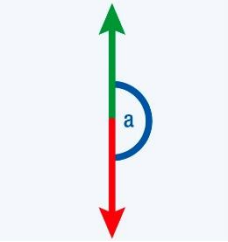
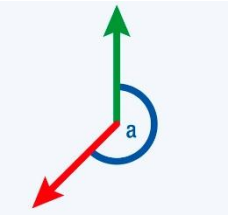
We measure angles in '**degrees'**. Use a small circle after a number to represent degrees like this:



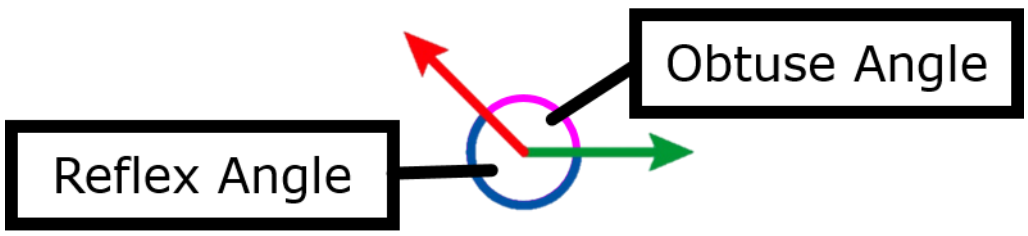
There are 360° in the full rotation of a single circle.



As angles increase the **name of the angle** changes:

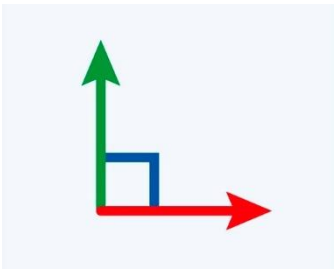
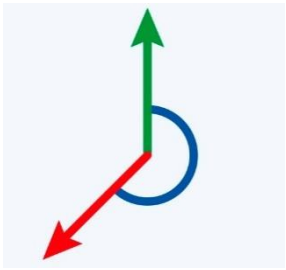
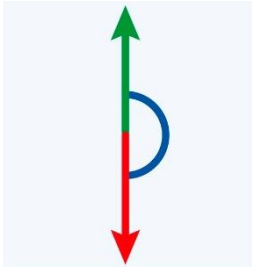
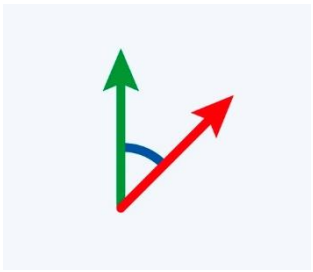
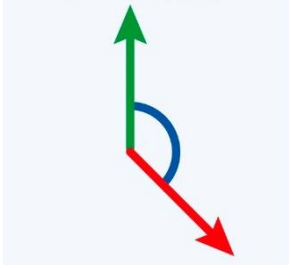
Acute angle An angle that is less than 90°	
Right angle An angle that is 90° exactly	
Obtuse angle An angle that is greater than 90° but less than 180°	
Straight angle An angle that is 180° exactly	
Reflex angle An angle that is greater than 180° but less than 360°	

Make sure you are measuring the correct angle:



Activity 3.3

1. Match the name of the angle with the picture. Write the letters on the lines.

1. _____		a) Acute angle
2. _____		b) Right angle
3. _____		c) Obtuse angle
4. _____		d) Straight angle
5. _____		e) Reflex angle

2. Are these statements true or false? (Circle your answer)

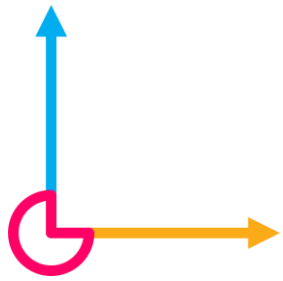
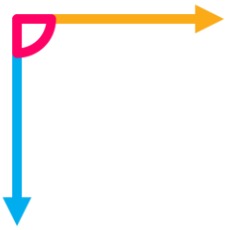
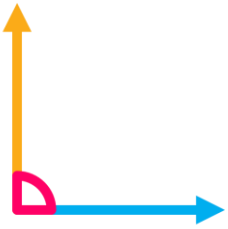
a) A right angle is less than 90°. **True** **False**

b) A 180° angle is called a straight angle. **True** **False**

c) A reflex angle is always greater than 180°. **True** **False**

d) There are 270° in a full rotation. **True** **False**

3. How many degrees are being shown in these pictures?

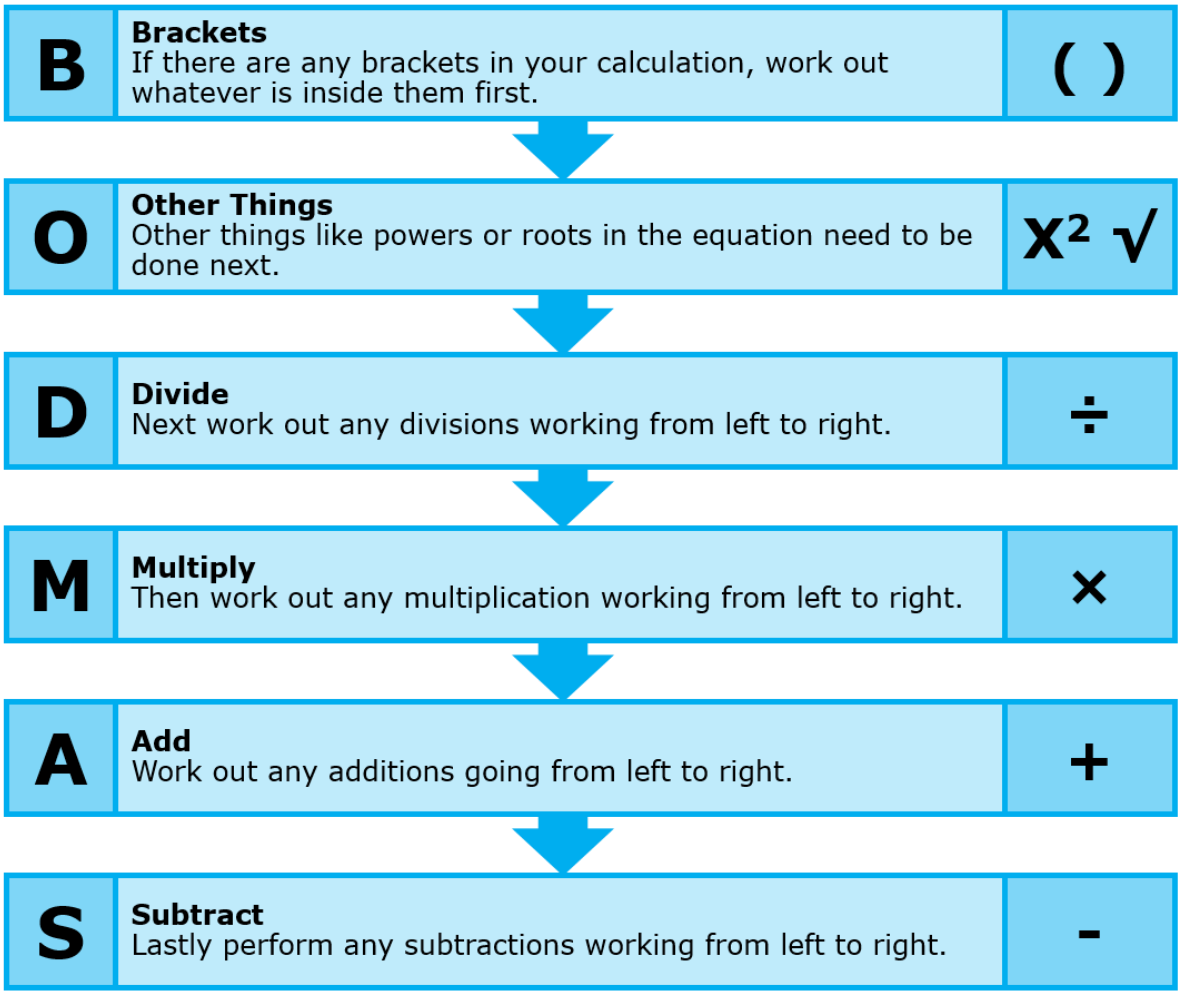
	a)
	b)
	c)
	d)

Lesson 3.4 Calculations

Order of Operations

The order of operations is a set of rules to make sure we work out equations properly. It tells us which parts of an equation need to be done first to make sure we get the right answer.

To remember the correct order of operations (correct order to work out the equation) use the word **BODMAS.**



Let's work through an example:

108 - (5 + 2 × 19) ÷ 4

Step 1 **B**	Work out the **brackets** first: 108 - **(5 + 2 × 19)** ÷ 4 We need to do the **multiplication (×) first**, then the **addition (+)**: 108 - (5 + **2 × 19**) ÷ 4 =108 - (**5 + 38**) ÷ 4 = 108 - **43** ÷ 4
Step 2 **O**	Are there any **other things** to be calculated? **No.**
Step 3 **D**	Work out the **division** next: 108 - **43 ÷ 4** = 108 – 10.75
Step 4 **M**	Are there any **multiplications** to work out? **No.**
Step 5 **A**	Are there any **additions** to make? **No.**
Step 6 **S**	Work out the **subtraction**: **108 – 10.75** = **97.25**

Activity 3.4

1. Work out the equations using **BODMAS**. You can use a calculator.

a) 13 × 4 + 21 ÷ 6 =	b) 147 ÷ 4 – (3 × 7) =
c) (113 – 76) × (4 ÷ 2) =	d) 12 × 8 – (12 + 17) =
e) 10 + 18 x 8 ÷ 15 =	f) 72 ÷ (3 + 5) ÷ 8 =
g) 23 – 4 × 4 + 27 =	h) (23 +5) ÷ 5 x 2 =
i) 12 – 16 ÷ (4 × 2) =	j) 12 × (7 + 2) ÷ 15 =
k) (12 + 8) ÷ (67 – 51) =	l) (72 – 4) × 15 + 9 =
m)72 ÷ 3 + 20 ÷ 8 =	n) (10 + 16) ÷ (57 – 37) =
o) (40 – 25) × 3 – 22 =	p) 5 x (4 + 8) ÷ 8 =
q) (119 – 47) ÷ (3 + 2) =	r) 5 x 6 – (12 – 7) =

s) 18 ÷ (10 – 2) + 3 =	t) (18 + 9) ÷ 3 ÷ 4 =
u) 3 x 10 – (3 – 2) =	v) 12 ÷ 2 + 2 x 7 =
w) (100 –75) ÷ 4 + 47 =	x) (38 + 4) ÷ (2+6) =
y) 10 ÷ (1+3) x 3 =	z) 200 – 21 × (12 – 4) =

2. The brackets are missing from the equations. Put the brackets in to make the statement true.

a) 99 ÷ 3 + 7 = 9.9
b) 540 – 15 + 2 × 2 × 4.5 = 387
c) 3 + 3 × 8 ÷ 2 = 24
d) 2 + 6 × 17 - 7 = 80

3. Put a tick or cross next to these statements to say if they are correct or incorrect:

a) 9 ÷ 3 + 7 = 15		b) 240 – (10 + 2) × 9 = 162	
c) 6 × 8 ÷ 2 = 24		d) (19 + 5) × (5 – 3) = 50	

Lesson 3.5 Area and Volume

Area is the size of a surface.

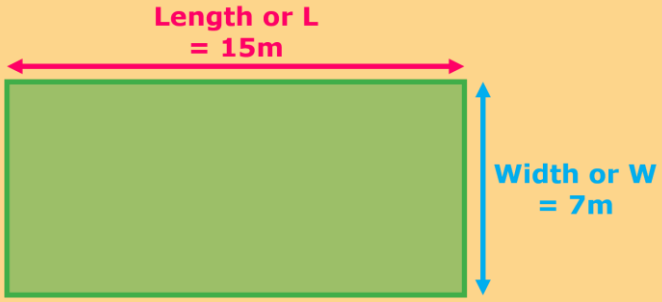
To work out the area of a simple square or rectangle shape:

Area = Length × Width

Or

Area = L × W

Here is an example:



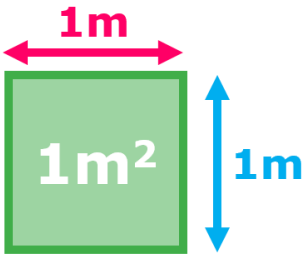
Let's work it out:

Area = **L × W**
= **15m** × **7m**
= **105m²**

The area of this rectangle is **105m²**.

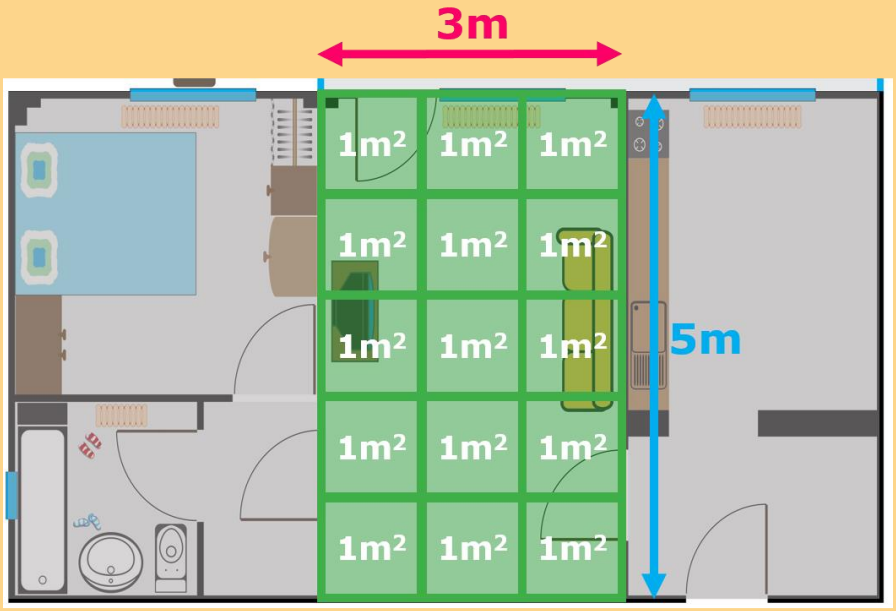
Area measurements are written as units squared with this little ^{2}. A good way to remember this is to think about the shape as flat with only **2 dimensions** (length & width).

1 square metre looks like a square that is 1m long and 1m wide.



It is written like **1m²**.

This measurement is often used to measure the floor of a room for carpet.



Let's work it out:

Area = **L × W**
= **3m** × **5m**
= **15m²**

The area of this room is **15m²**.

Volume is how much space a 3D shape takes up.

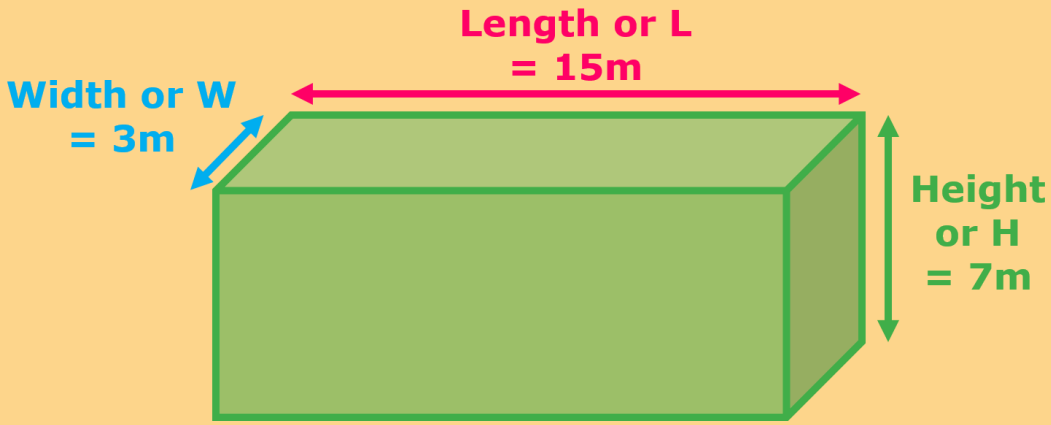
To work out the volume of a simple 3D rectangle shape:

Volume = Length × Width × Height

Or

Volume= L × W × H

Here is an example:



Let's work it out:

Volume = **L × W × H**
= **15m** × **3m** × **7m**
= **315m³**

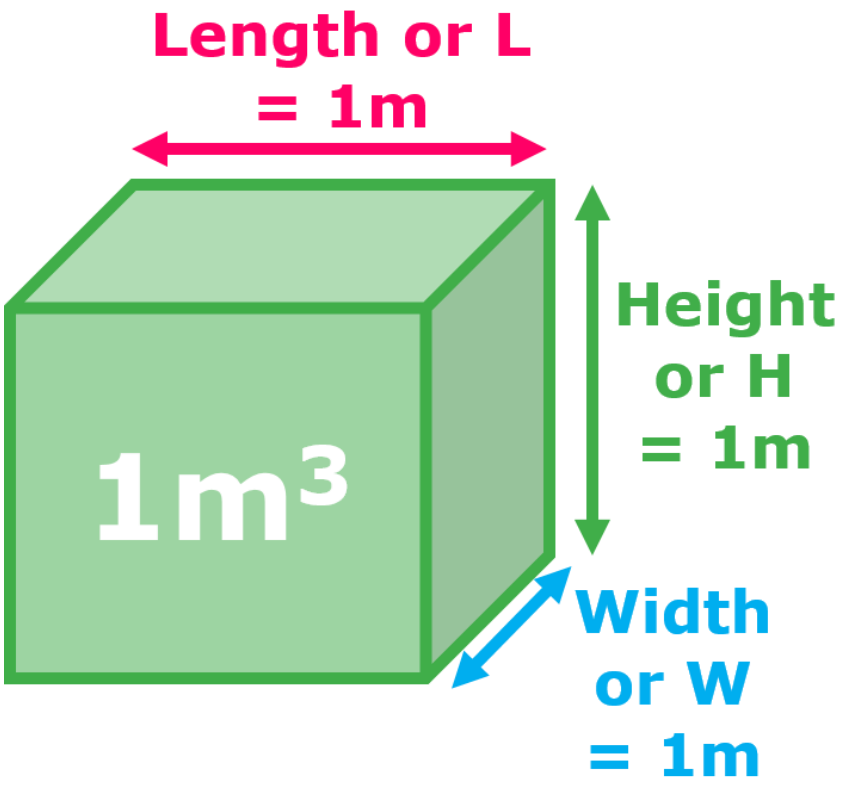
The volume of this 3D rectangle shape is **315m³**.

Volume is measured in units cubed or cubic units and written with this little ^{3}. A good way to remember this is to think about the shape as solid with **3 dimensions** (length & width & height).

1 cubic metre looks like a box or cube that is 1m long, 1m wide and 1m high.

It is written as **1m^3**.

Cubic metres are often used to measure materials like soil or concrete or how much space is in a shipping container.



Activity 3.5

1. Work out the **area** of the following shapes. You can use a calculator.

a) 23cm x 12cm =	b) 4m x 12m =
c) 45mm x 62mm =	d) 10cm x 10cm =
e) 19cm x 19cm =	f) 102m x 49m =
g) 67mm x 114mm =	h) 29cm x 58cm =

2. Work out the **volume** of the following shapes. You can use a calculator.

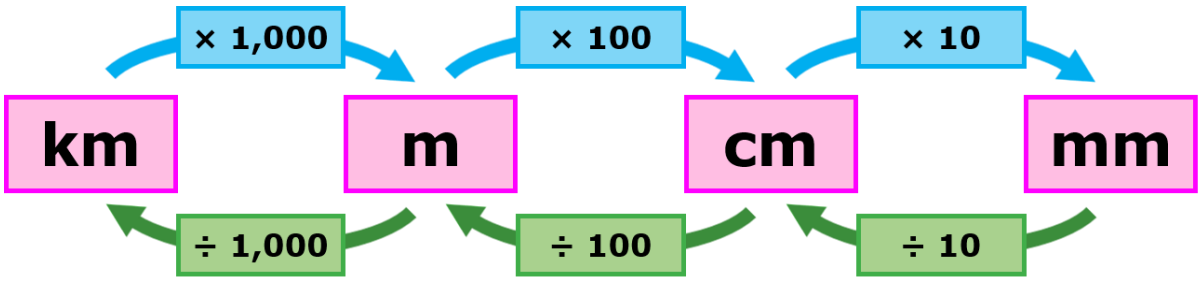
a) 45cm x 10cm x 13cm =	b) 1m x 16m x 22m =
c) 95mm x 13mm x 51mm =	d) 17cm x 66cm x 2cm =
e) 22cm x 40cm x 0.5cm =	f) 15m x 10m x 8m =
g) 90mm x 141mm x 50mm =	h) 33cm x 64cm x 96cm =

Lesson 3.6 Converting Metric Units

Metric units are used to measure:

Distance	Weight	Liquid
Millimetres (mm)	Grams (g)	Millilitres (ml)
Centimetres (cm)	--	--
Metres (m)	Kilograms (kg)	Litres (ltr)
Kilometres (km)	Tonnes (t)	--

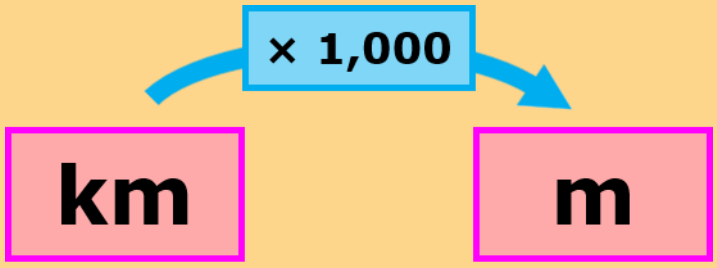
It is helpful to be able to convert metric units. You can use a chart like the one shown here to convert 1 metric unit into a different one.



For example:

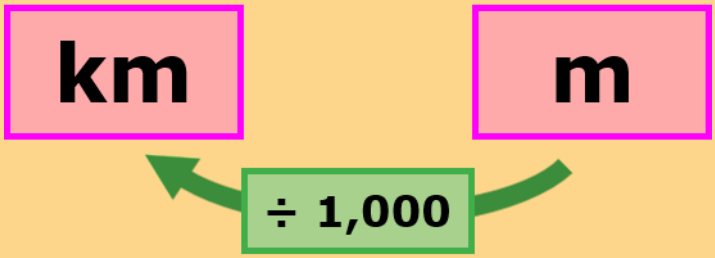
How many metres are there in 3kms?

Using this part of the chart we can work it out:



3km × 1,000 = 3,000m

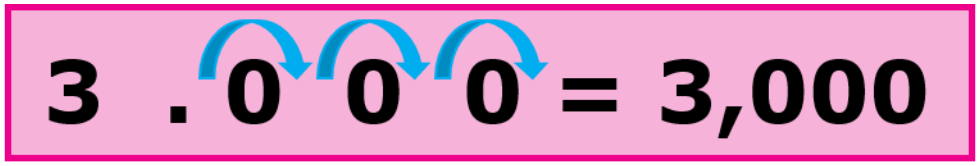
It works back the other way too:



3,000m ÷ 1,000 = 3km

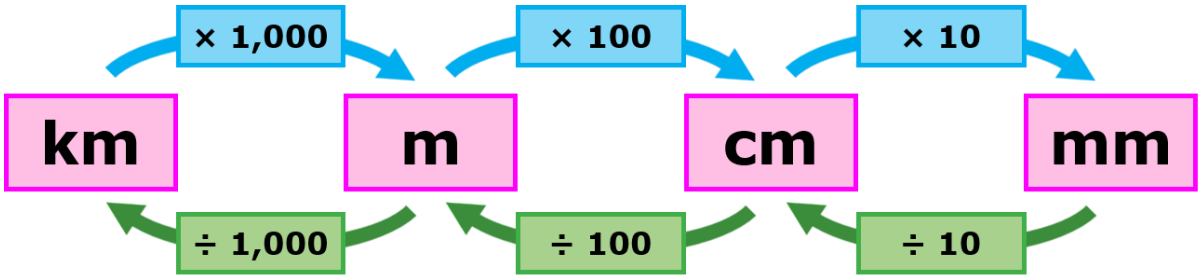
Did you notice something interesting about the zeros in both examples?

When we multiply we add the number of zeros to the original number to get the answer because we are moving the decimal point 1 space for each zero.



Activity 3.6

1. Using the chart work out the metric conversions in the table:



a) 12.5km = _____ m

b) 1450cm = _____ m

c) 7851m = _____ km

d) 45mm = _____ cm

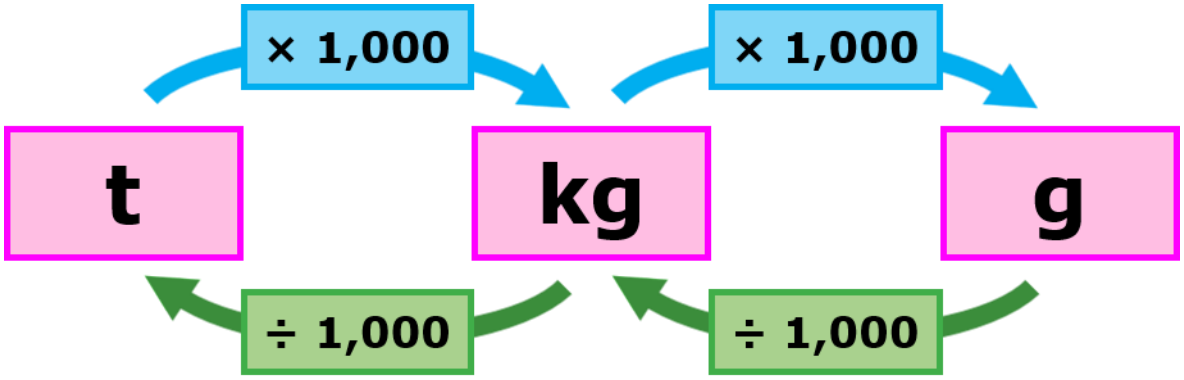
e) 10965km = _____ m

f) 468mm = _____ cm

g) 15.8cm = _____ mm

h) 14523m = _____ km

2. Weight can be converted in a similar way. Look at this chart and complete the conversions in the table.



a) 14.8t = _____ kg

b) 2250g = _____ kg

c) 9577kg = _____ t

d) 67t = _____ kg

e) 2.44kg = _____ g

Lesson 3.7 Application of Rates

You see the application of rates everywhere in your day-to-day life. Here are some examples:

- The speed of your car is measured in kilometres per hour (km/hr).

- Petrol prices are advertised as a cost per litre (c/ltr).

- Fresh fruit, vegetables and meat are priced per kilogram ($/kg).

- Carpet and floor coverings are priced per square metre ($/$m^2$).

- Gardening supplies like soil or mulch are priced per cubic metre ($/$m^3$).

You can use the application of rates to work out what something will cost or how long it might take to travel somewhere.

Here is an example:

Apples cost **$2.90 per kg**.

You are buying a bag of apples that weighs **3kg**.

How much will it cost?

Let's work it out.

Cost = Weight × Cost per Weight
Cost = **3kg** × **$2.90 per kg**
Cost = 3 × 2.9
Cost = **8.7**

The price for the bag of apples is $8.70

Here is another example:

You are driving from your home to the airport.

The airport is **100km** away.

Your average speed for the trip is **60km per hour**.

How long will it take you get there?

Let's work it out.

An average speed of **60km** per hour means you will travel about **1km each minute**.

This can be work out by dividing your speed by 60 minutes:

60km/hr divided by 60 minutes = 1km per minute.

Time = Distance × Speed
Time = **100km** × **1km/min**
Time = **100 min**

If you need to travel 100km it should take about 100 minutes, or 1 hour and 40 minutes.

Activity 3.7

1. This room has a floor area of **34.7m^2** that needs to be carpeted. Work out the cost to carpet the room using each of the different types of carpet listed in the table. You can use a calculator.

Carpet	$ per m^2	Total Cost
a) Basic carpet	$120	
b) Wool carpet	$160	
c) Premium carpet	$275	

2. Work out the total cost of these groceries:

Total Cost: $ _____

Lesson 3.8 Graphs and Data

Graphs are used to show information in a graphic way that makes it easy to compare different things.

Usually the information used to make a graph is organised into a 'table'.

Tables are useful for listing information because you can divide the information into simple 'categories' and 'series':

Favourite Sport

Category →	Football	Cricket	Rugby	Soccer	Basketball
Series →	4	6	2	5	3

You can have more than 1 series in a data table. For example you could ask 20 people each month what their favourite sport is like this:

Favourite Sport

Category →	Football	Cricket	Rugby	Soccer	Basketball
Series 1 January	4	6	2	5	3
Series 2 February	1	12	4	3	0
Series 3 March	2	8	2	4	4

Using this table we could take different information or data from the table to graph different interesting things. For example we could look at people's favourite sport in February.

Favourite Sport

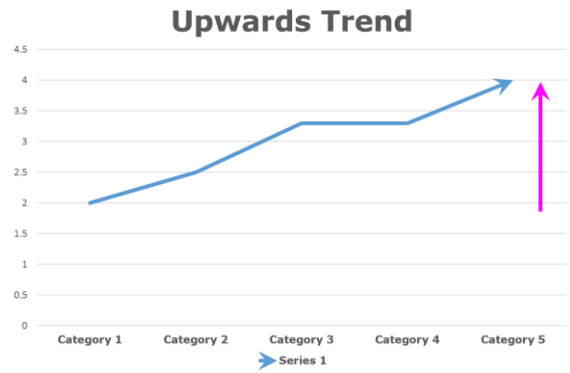
Category →	Football	Cricket	Rugby	Soccer	Basketball
Series 1 January	4	6	2	5	3
Series 2 February	1	12	4	3	0
Series 3 March	2	8	2	4	4

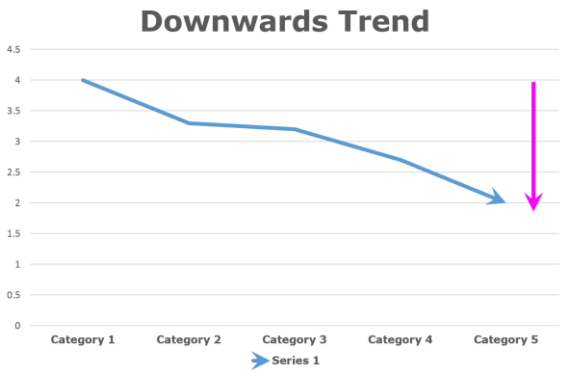
Or we could graph how many people say cricket is their favourite sport each month so see if there is a 'trend'.

Favourite Sport

Category →	Football	Cricket	Rugby	Soccer	Basketball
Series 1 January	4	6	2	5	3
Series 2 February	1	12	4	3	0
Series 3 March	2	8	2	4	4

A **'trend'** is when the numbers for each item keep getting bigger over a period of time, or smaller over a period of time.

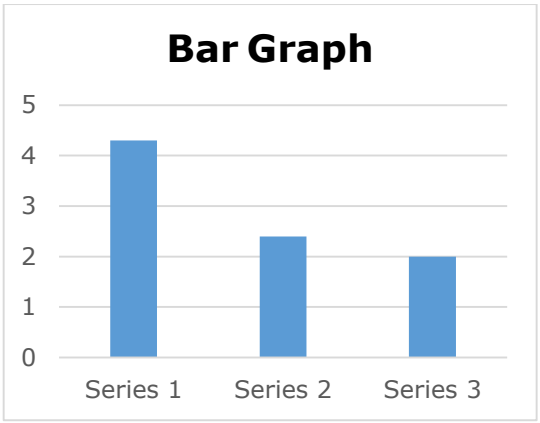


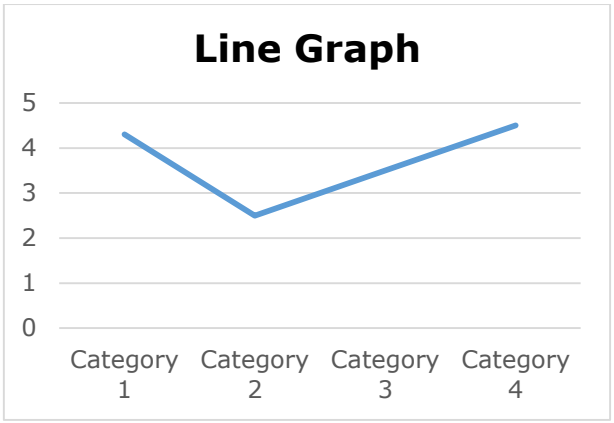


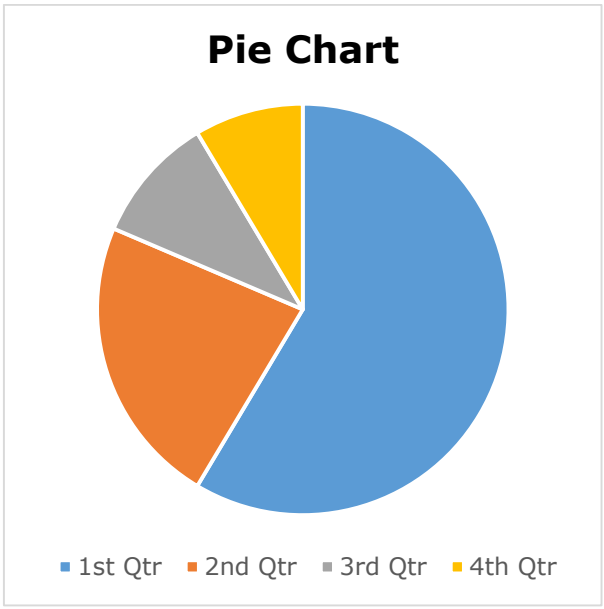
This information can be used to create many common graphs.

You can create graphs manually by drawing them, or you can use software like Microsoft Office to create graphs.

Common graphs are:







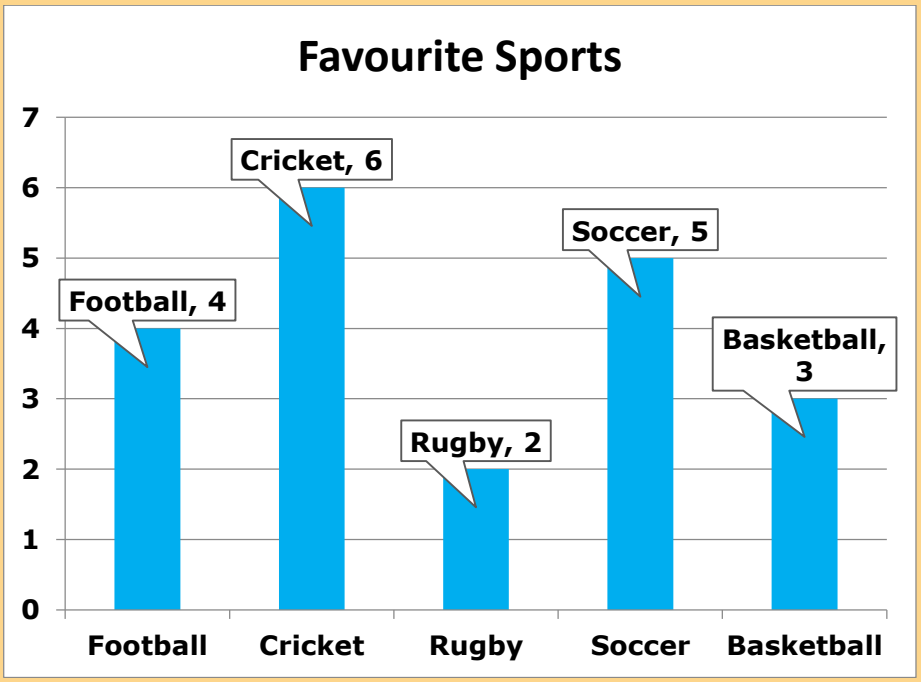
A **Bar Graph** uses a range of bars to display information.

Here is an example:

We asked **20** people what their **favourite sport** is. These are the results:

Football	Cricket	Rugby	Soccer	Basketball
4	6	2	5	3

This information can be displayed in a bar graph like this:



Bar graphs are very useful for being able to quickly see and compare all of the information in a table. You can see that **Cricket** is the **most** popular and **Rugby** is the **least** popular sport.

You can use a bar graph whenever you are working with information that can be compared or divided into the same types of units.

A **Line Graph** shows information that is connected in a series and is used to show information over time.

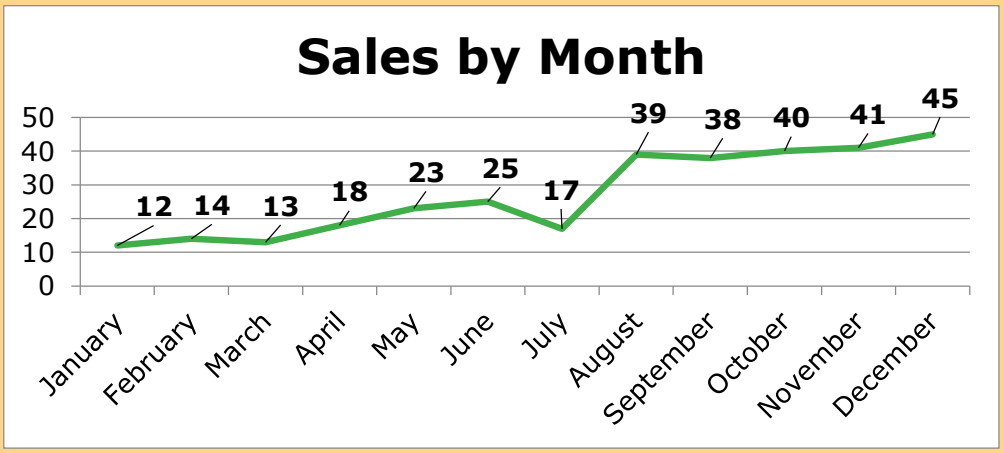
Here is an example:

These are the number of units sold each month for the last year:

January	12
February	14
March	13
April	18
May	23
June	25

July	17
August	39
September	38
October	40
November	41
December	45

This information can be displayed in a line graph like this:



Sales have increased over the year with a big improvement between July and August after a drop from June to July.

Line graphs are useful for seeing trends or patterns over time.

A **Pie Chart** is a graph in the shape of a circle that is cut into slices to show how much of the total amount each item makes up.

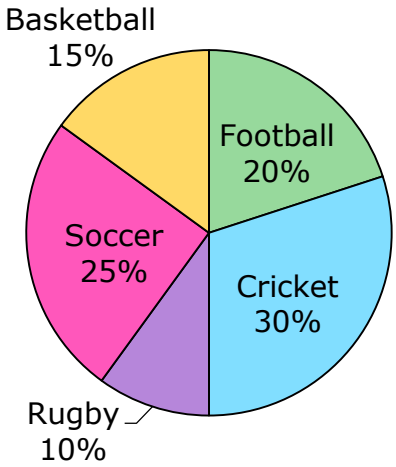
Using the same information as the bar graph the pie chart looks like this:

Favourite Sport

Football	Cricket	Rugby	Soccer	Basketball
4	6	2	5	3

Pie charts are really useful for comparing the information in the table to see which items make up the most or least number of parts.

Pie charts can also show you the percentage that each item makes up.



Activity 3.8

We conducted a survey to find out what type of movies people like to watch at different times during the year. We asked 100 people each month for a whole year.

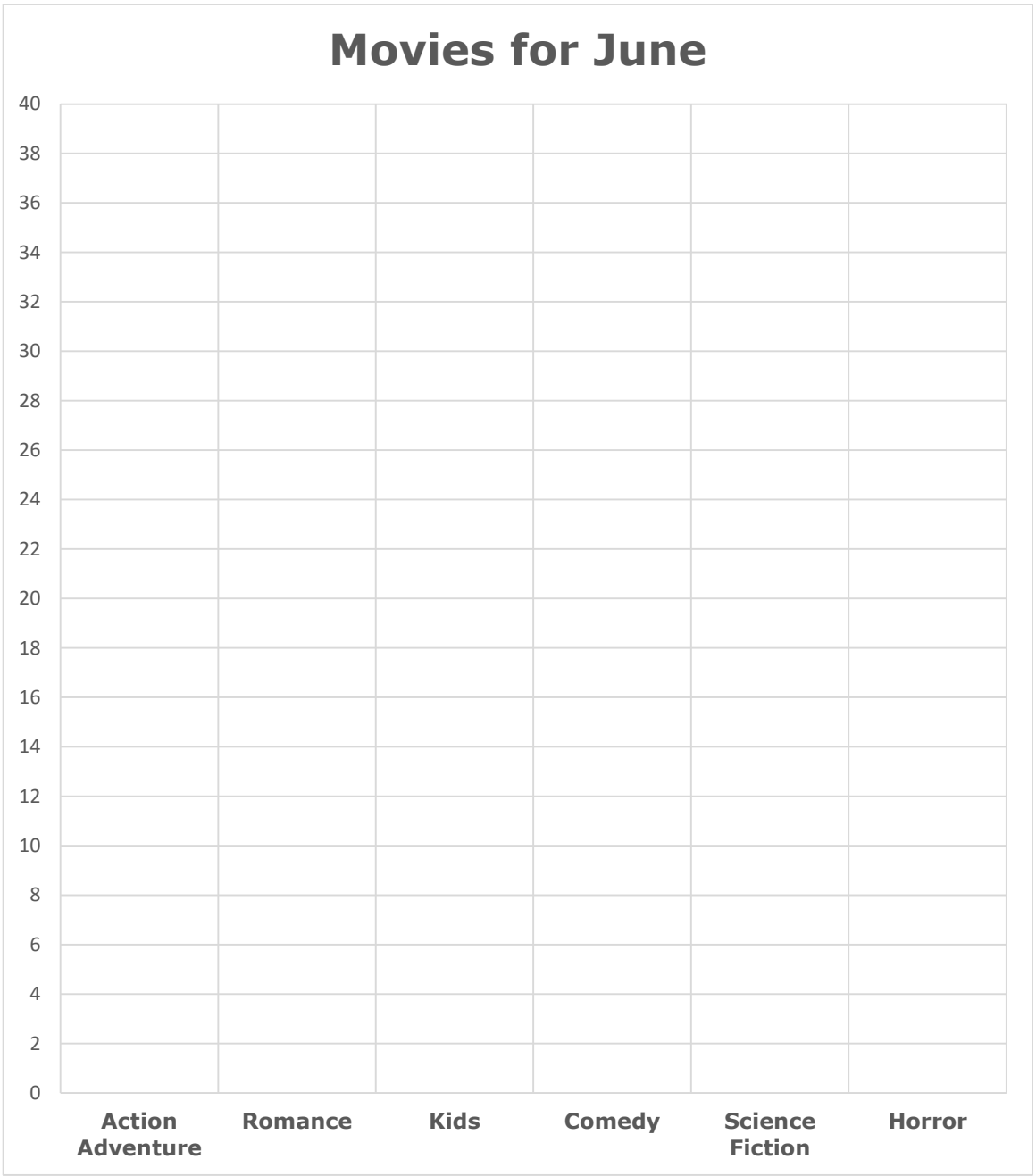
The results of the survey are shown here in this table:

	Action Adventure	Romance	Kids	Comedy	Science Fiction	Horror
Jan	14	22	41	11	5	7
Feb	12	36	14	18	12	8
Mar	29	21	12	13	16	9
Apr	20	21	11	23	19	6
May	11	19	9	25	21	15
Jun	24	11	38	12	11	4
Jul	30	31	12	4	6	17
Aug	26	26	11	6	11	20
Sep	24	16	36	5	3	16
Oct	19	17	9	12	14	29
Nov	22	19	8	4	13	34
Dec	21	28	29	6	6	10

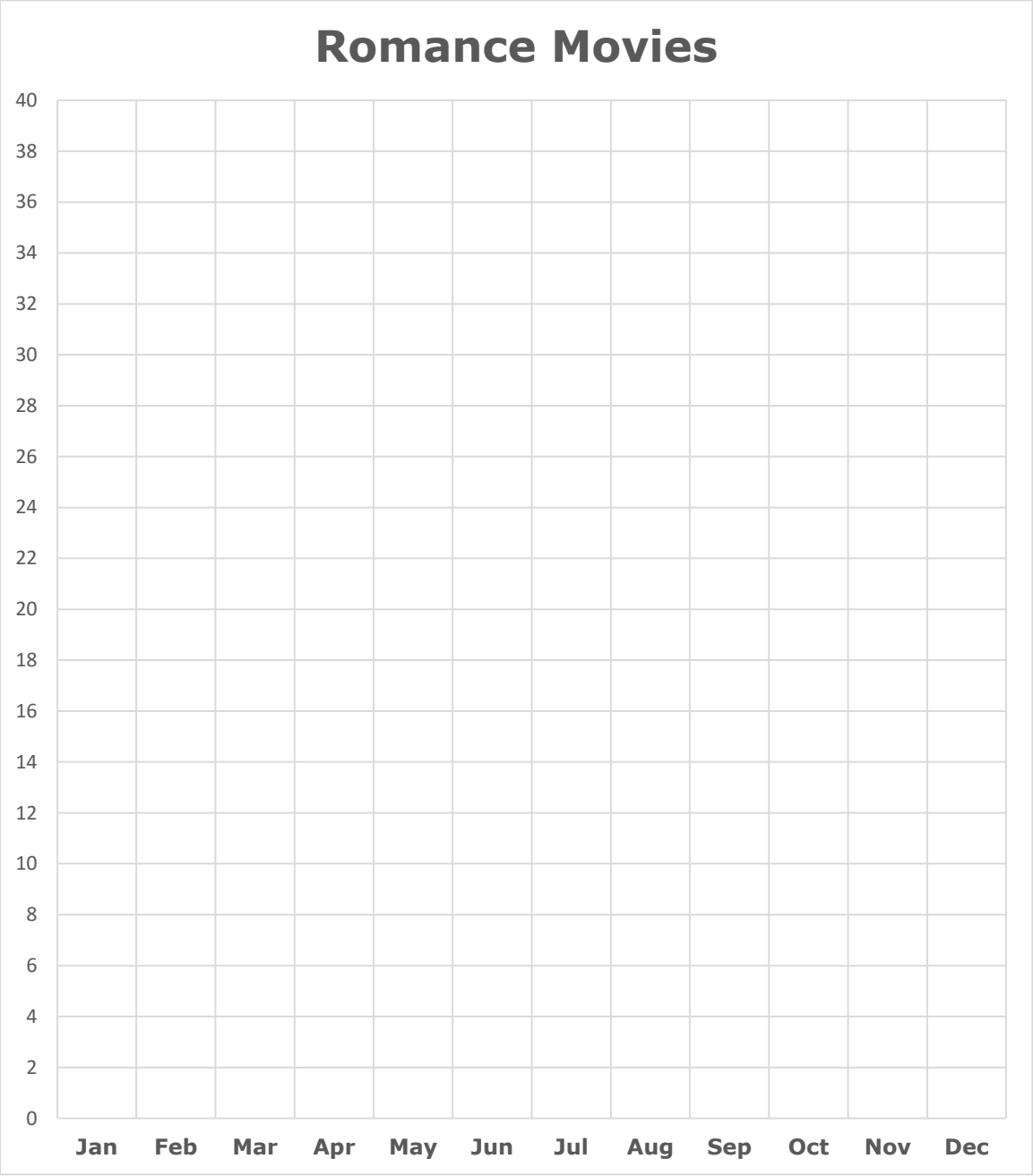
Use this information to answer questions 1, 2 and 3.

Complete the following activities using the table on the previous page.

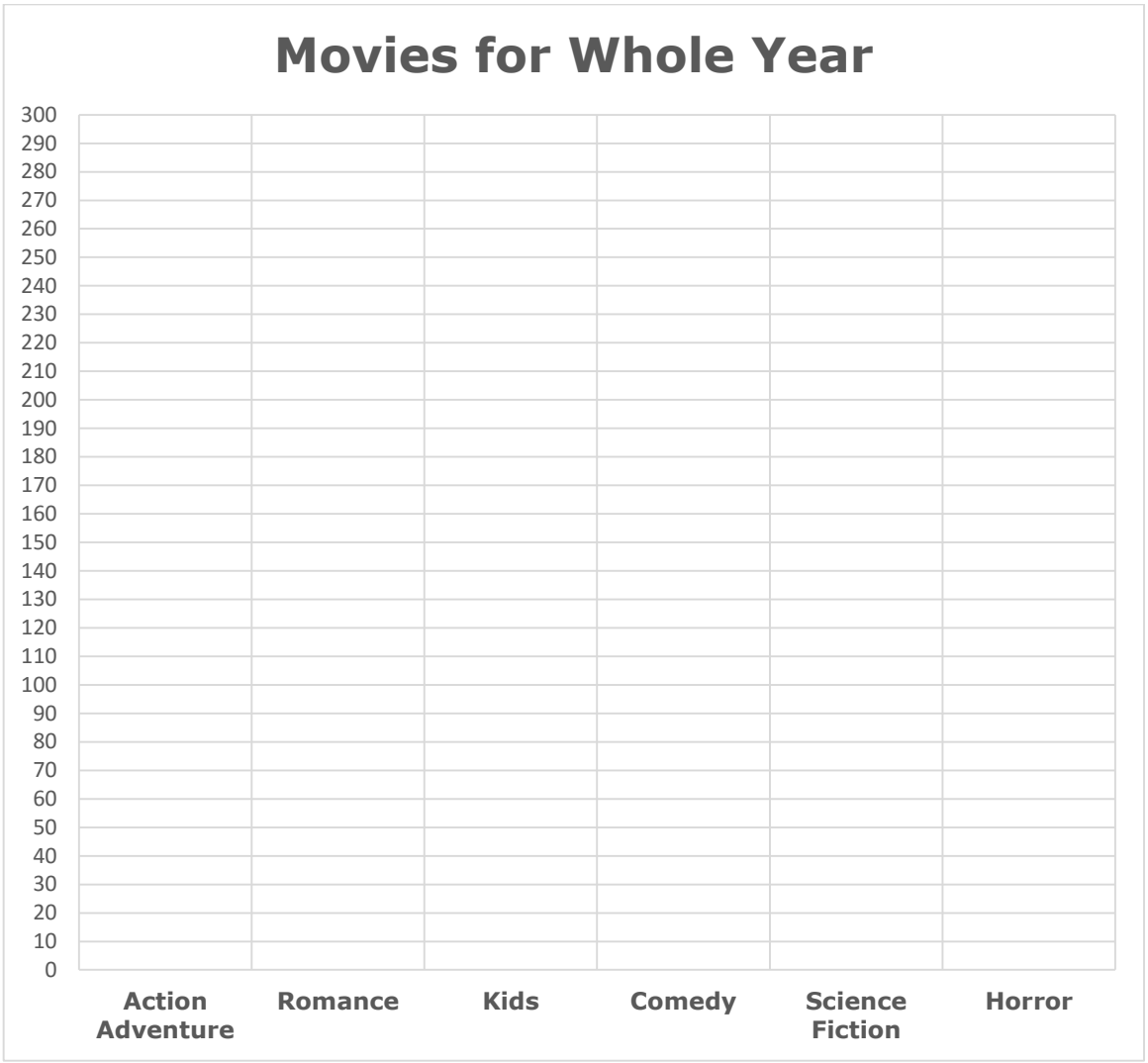
1. Draw a bar graph showing the data for **June**.



2. Draw a line graph showing the numbers each month that people went to **Romance** movies.



3. Draw a bar graph to show how popular each type of movie is across a whole year.



a) Which movie kind is the most popular?

ANSWER:

b) Which movie kind is the least popular?

ANSWER:

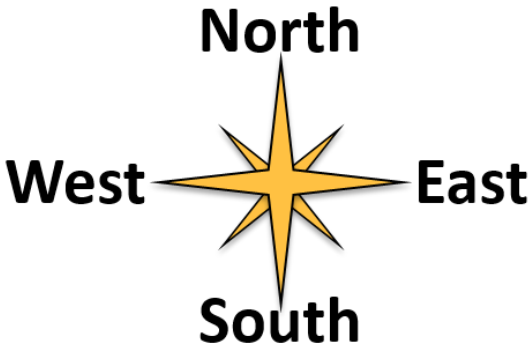
Lesson 3.9 Reading Maps

You may need to use maps for your job or in everyday life. If you know how to read a map properly you will never get lost!

Direction and Coordinates

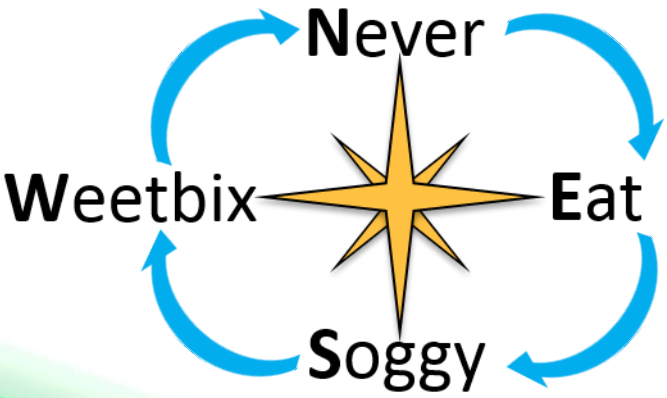
To make sense of maps it is important to know which direction you are supposed to be going. Maps use a **Compass** to show you which way is North.

A compass is made up of 4 main points and looks like this:

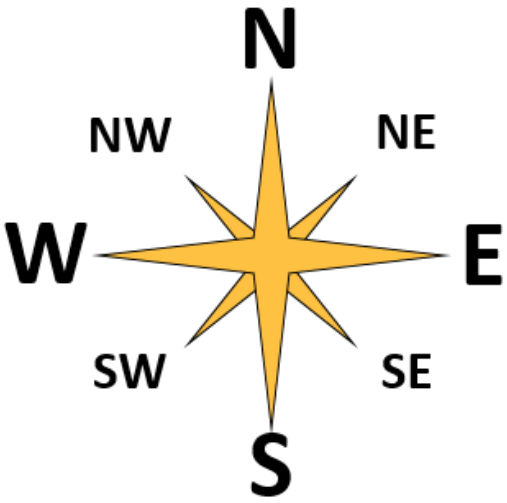


You can remember which order the compass goes in my saying:

"**N**ever **E**at **S**oggy **W**eetbix"



Between each of the 4 main points there are points that are half way between the others:



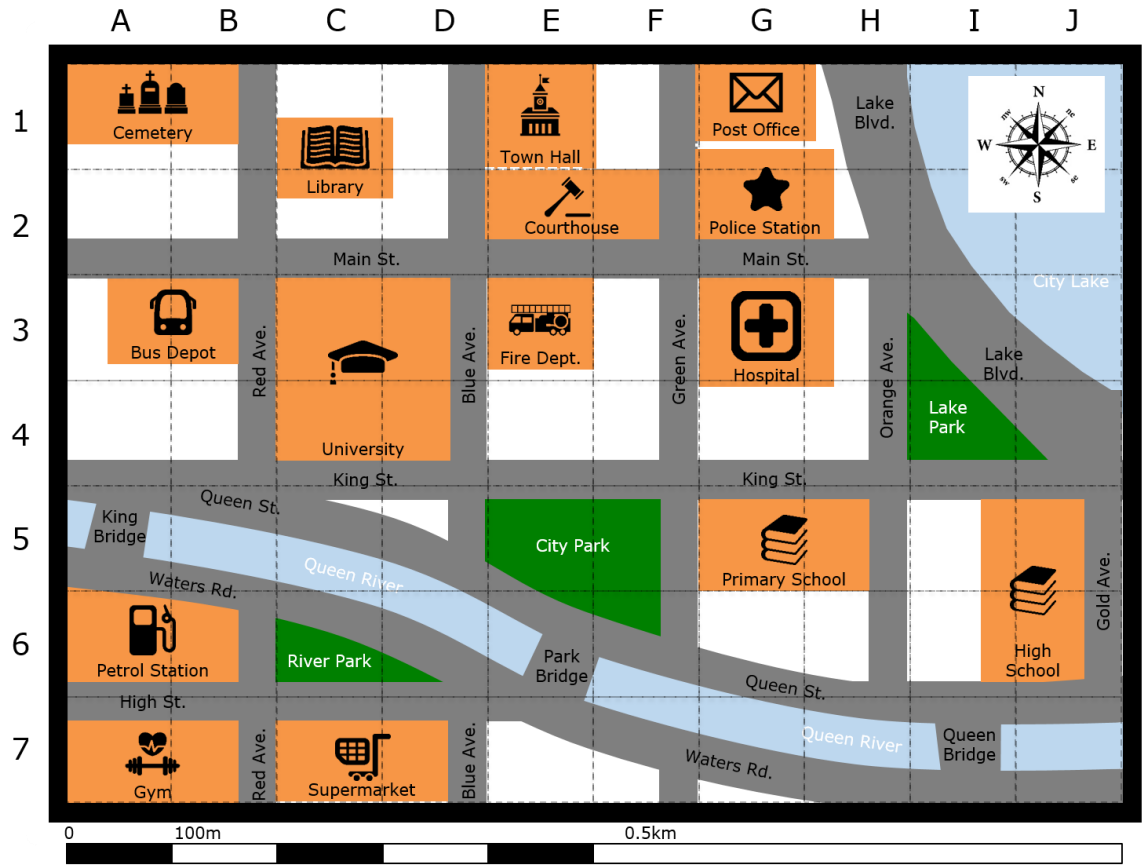
If you are looking at a map grid you can use all 8 points to describe a direction from your current position (in the middle box):

NW	**N**	**NE**
W	**+**	**E**
SW	**S**	**SE**

You can use compass bearings to give directions. Imagine you are standing outside the town hall marked with '**X**' (map shown over page):

1. Move 1 square South.
2. Move 2 squares East along Main St.
3. Move 3 squares South along Green Ave.
4. Move 1 square West.

Where did you end up?

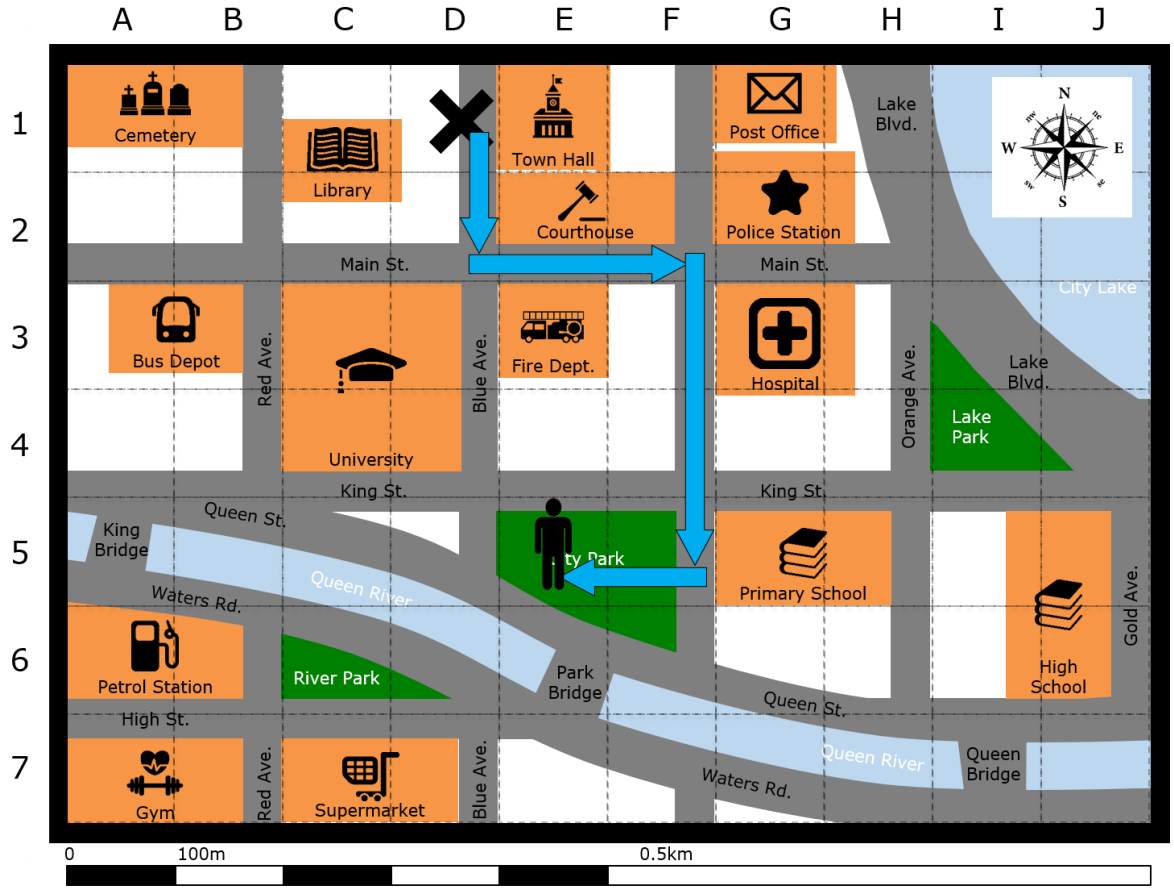


Turn the page…

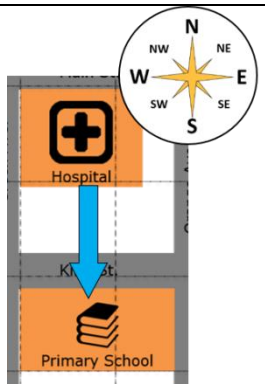
You were standing outside the town hall (marked with an '**X**'), you moved:

1. 1 square South.
2. 2 squares East along Main St.
3. 3 squares South along Green Ave.
4. 1 square West.

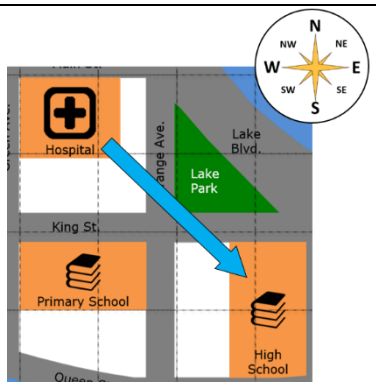
This path took you to City Park located on the Map at (E,5).



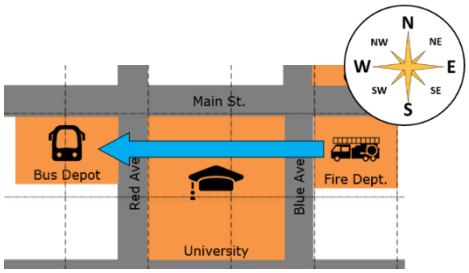
You can also use the compass bearings to describe the position of one thing to another. For example:



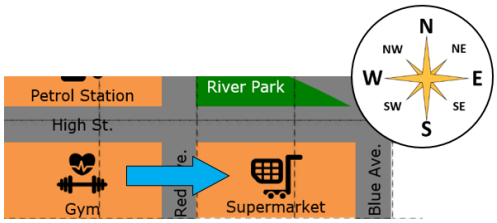
The Primary School is South of the Hospital.



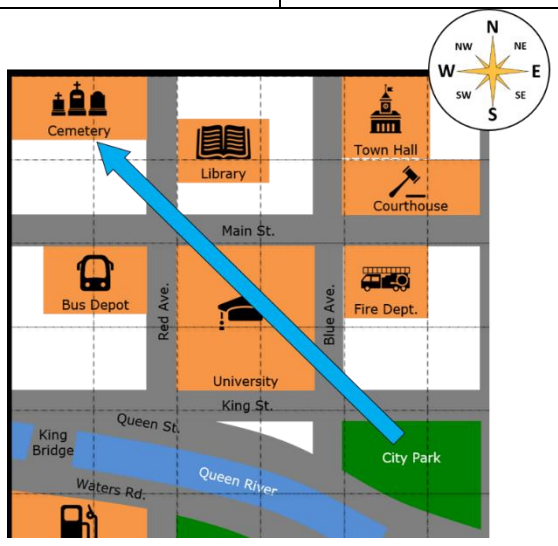
The High School is South-East of the Hospital.



The Bus Depot is West of the Fire Dept.



The Supermarket is East of the Gym.



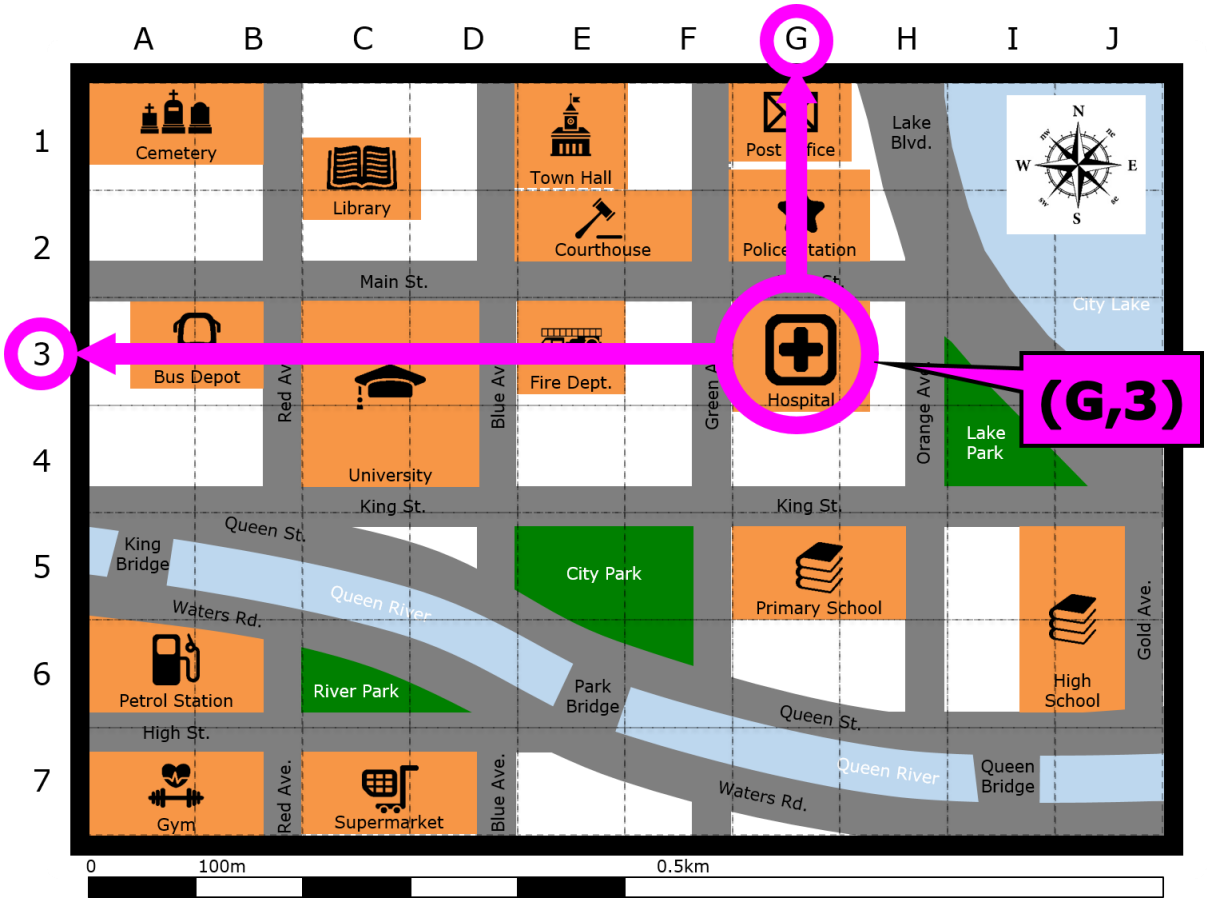
The Cemetery is North-West of the City Park.

Maps often use a grid to make it easier to find locations.

A street directory is a good example of this. Street directories use grid references to help you find the names of roads.

The way these grids work is to find where a row and a column meet. This point is called a **coordinate** (co-or-din-net).

Using the map here we can see that the **Hospital** is at the coordinates **(G,3).**

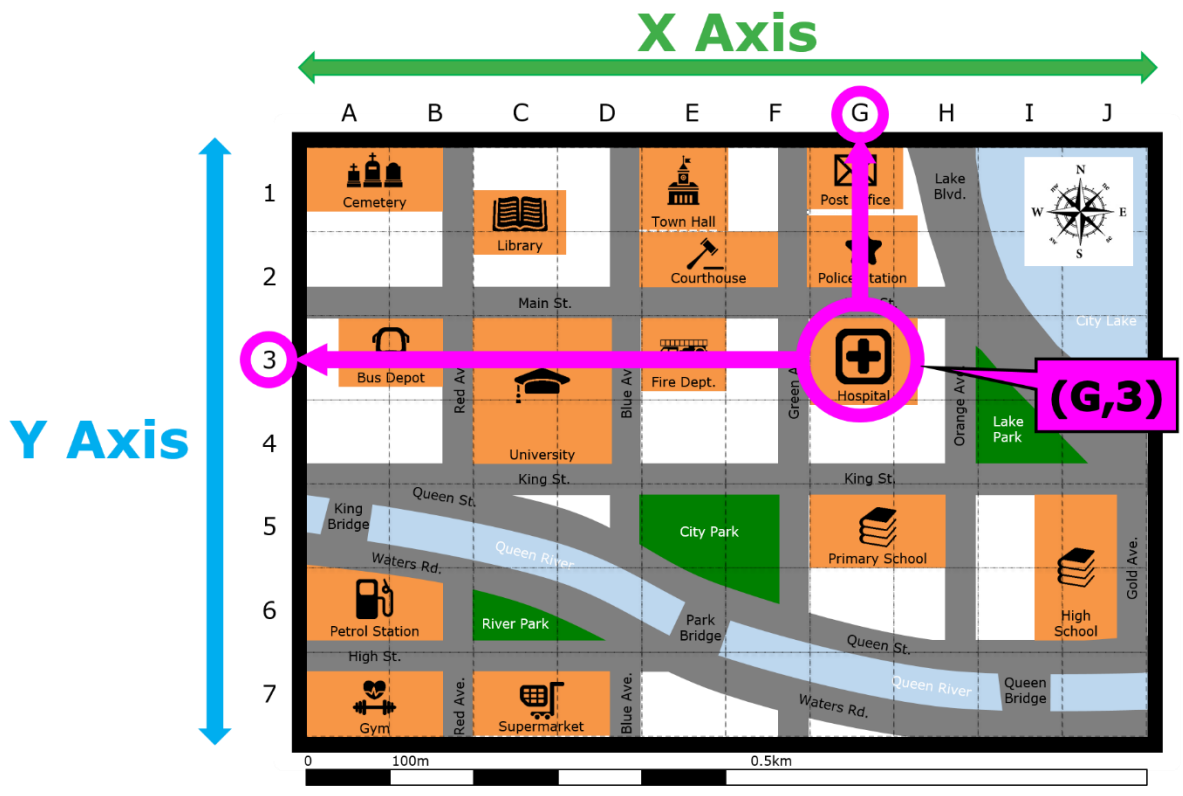


Coordinates are usually written inside brackets with the X axis first followed by a comma then the Y axis.

The **first part** of the coordinates is which **column** of the grid you should move along. These are marked with **letters**. This is known as the **'X axis'**. You can remember this because **X** is **A CROSS** and it moves **ACROSS** the page.

(G,3)

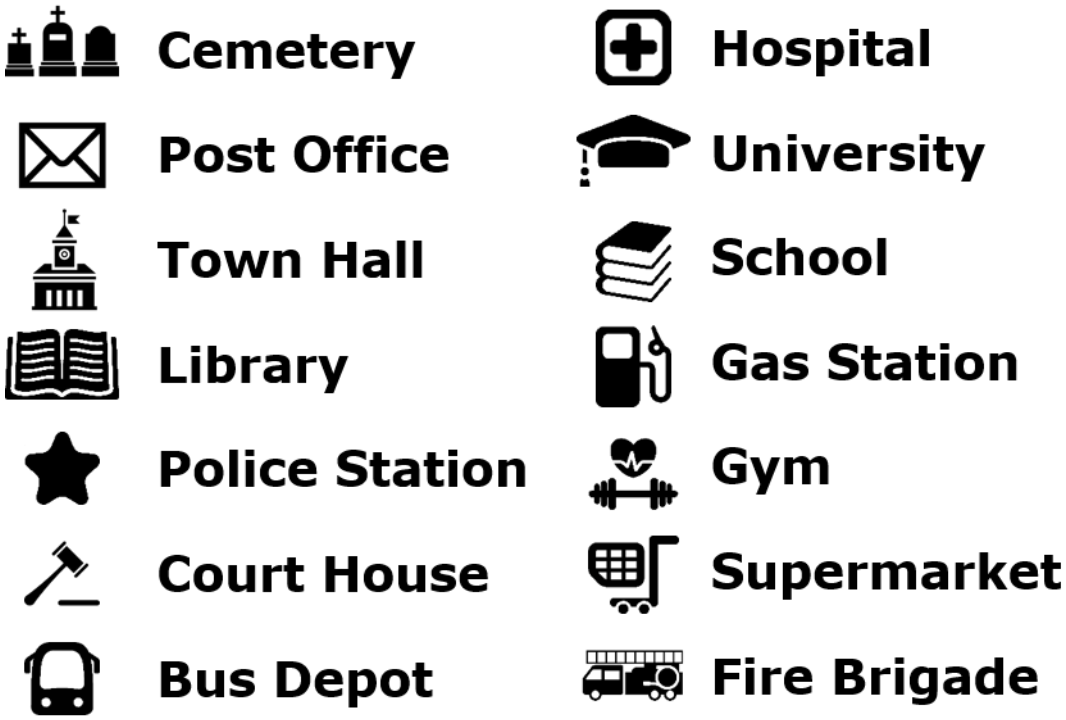
The **second part** of the coordinates is which **row** of the grid you need to move along. These are marked with **numbers**. This is known as the **'Y axis'**.



Map Symbols

Maps will often use a range of little pictures or **symbols** to mark different services, landmarks or other useful information.

Here is an example of the **key** (or 'legend') that goes with the map we have been looking at:

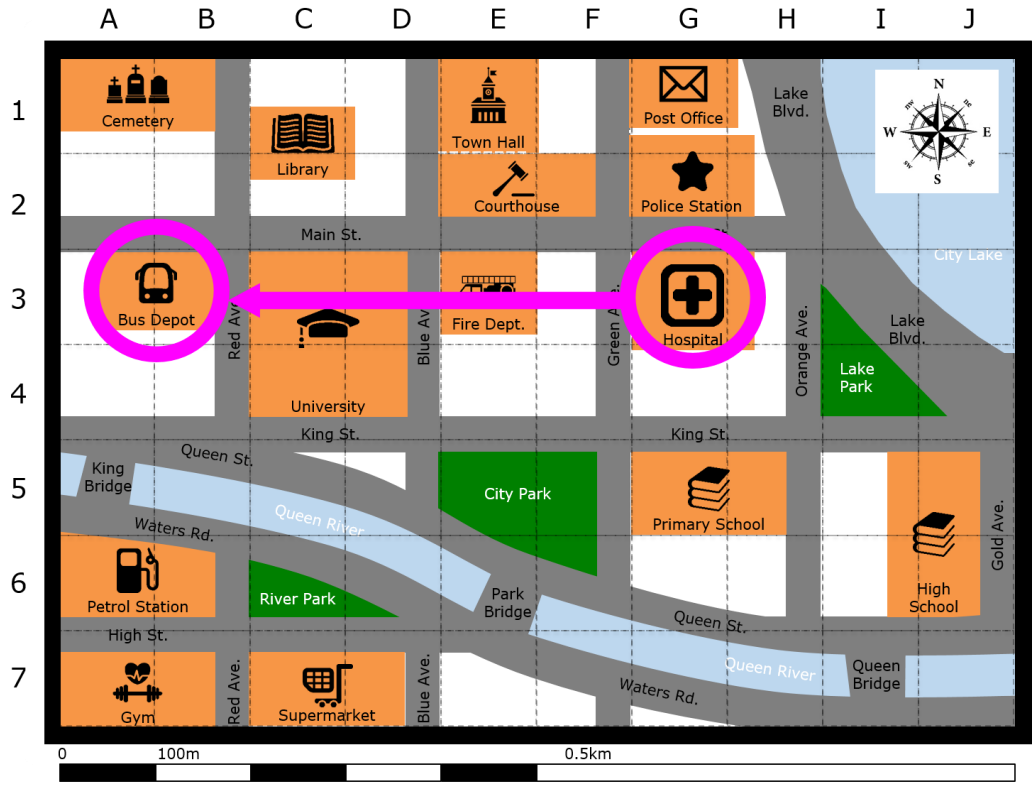


Understanding Map Scales to Find Distance

Every map will use something called a '**scale**' that helps you to work out the distance between points on the map. There are 3 different ways to write a scale:

Stated Scale	**1 cm = 250 km**
Linear Scale	0 5 10
Ratio Scale	**1 : 25,000,000**

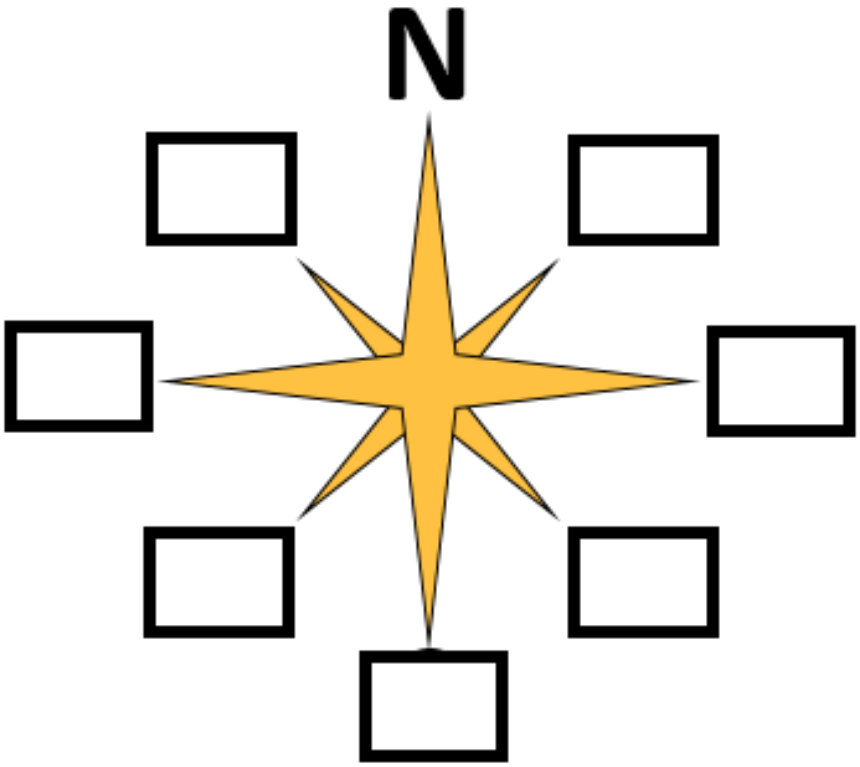
On the example here we have used a linear scale. You can see that each box in the grid is 100m x 100m. The whole area in the map is 1km wide and 700m or 0.7km long.



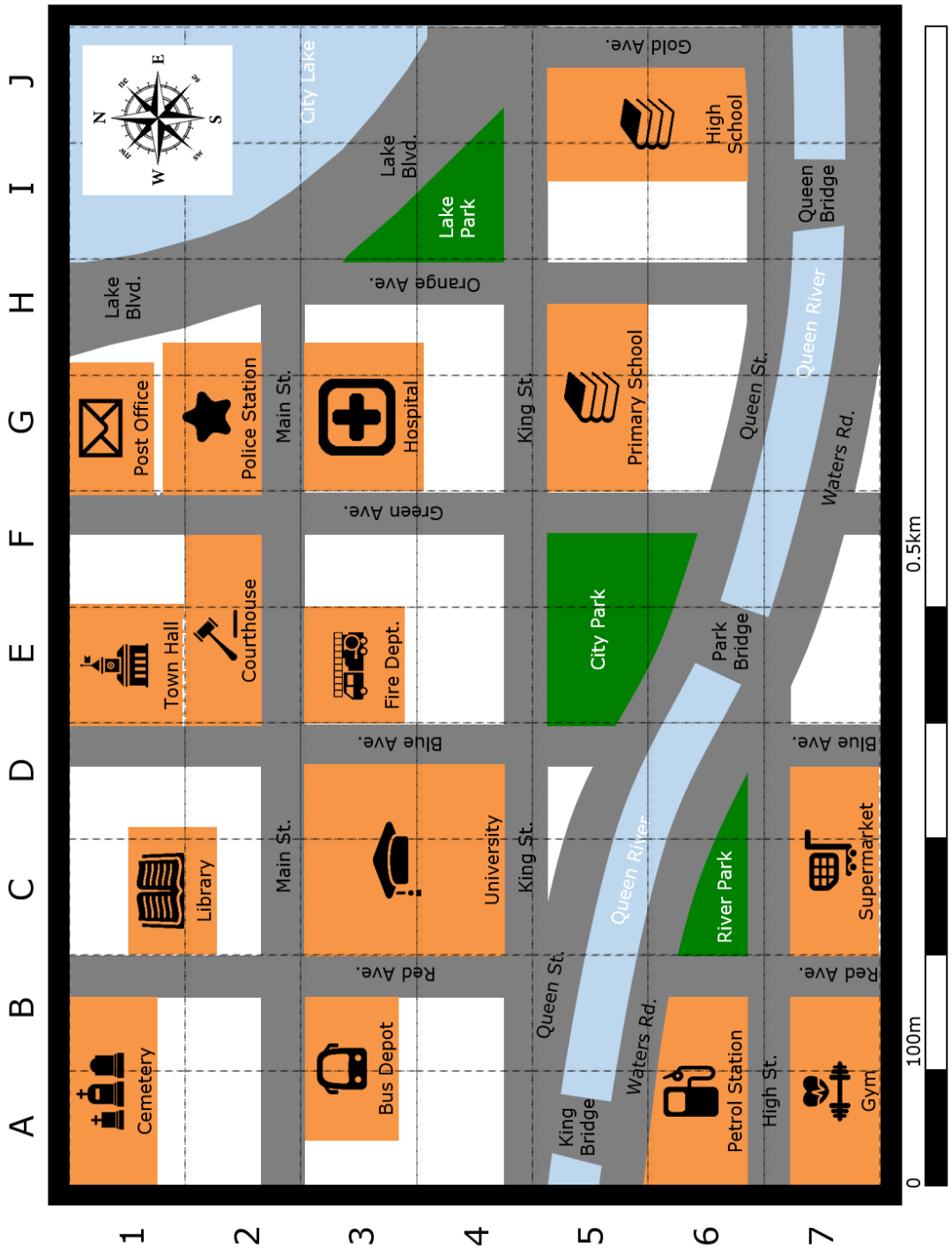
Using this scale we can see that the **Hospital** is **500m** away from the **Bus Depot**.

Activity 3.9

1. Fill in the missing compass labels:



Use this map to answer the following questions.



2. If you started at Town Hall (D,1) and followed these directions where would you finish?

   1. South 300m along Blue Ave.

   2. West 300m along Kind St.

   3. South 100m over King Bridge.

   Circle your answer:

a) Gym b) River Park c) Petrol Station d) Supermarket

3. Write down the coordinates of the following buildings:

a) Post Office	(,)
b) Fire Brigade	(,)
c) Town Hall	(,)
d) Queen Bridge	(,)

4. Match the symbol with the correct type of building. Write the letters on the lines.

1. _____		a) Supermarket
2. _____		b) Fire Department
3. _____		c) School
4. _____		d) Court House

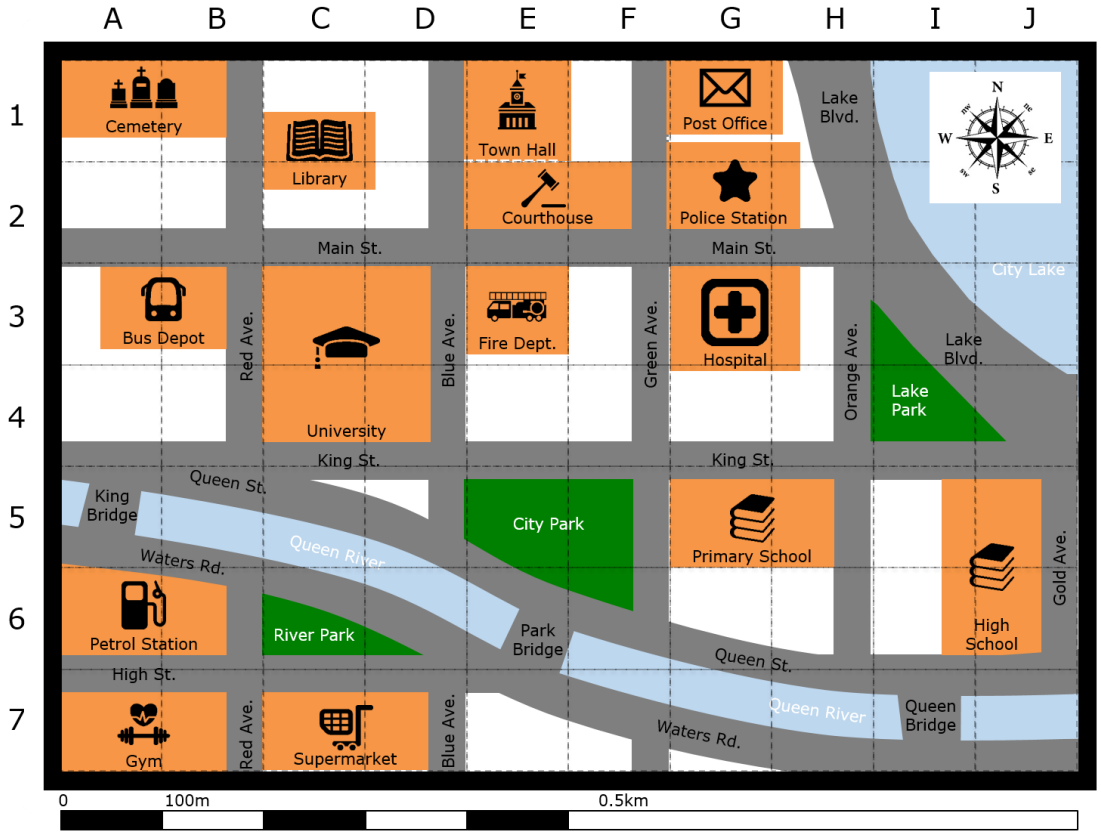
5. How far would you have to walk to get from Lake Park to City Park if you walk along King Street?

ANSWER: **m**

6. How far would you have to walk to get from the Bus Depot to Lake Park if you walked along Red Ave the turned and walked down King St?

ANSWER: **m**

7. Starting from the **Bus Depot** on Red Ave (B,3) draw the route you would take to visit each place in the order they are written here:
   - City Park.
   - Police Station.
   - Town Hall.

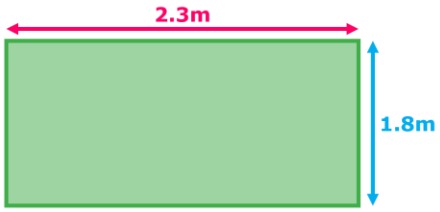


Lesson 3.10 Using Fractions, Decimals and Percentages

It can be useful to know how to calculate fractions, decimals and percentages with whole numbers.

If you are selling a product or providing a service you might need to work out the price after taking away a discount for example a **5% discount**.

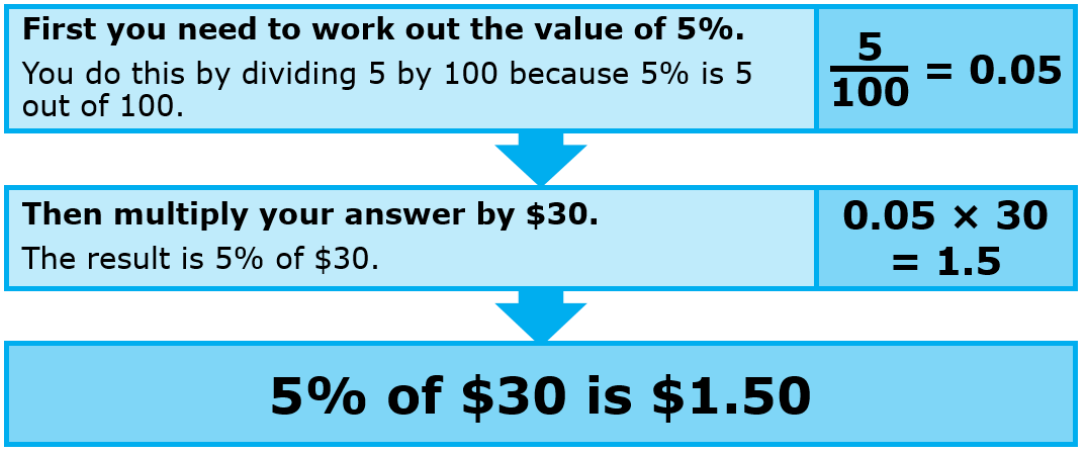
You might need to work out how much of a deposit you need to pay for something for example a **10% deposit**.



You might need to calculate measurements that use decimals for example **1.8m x 2.3m**.

You might need to work out how much your weekly payments are on a big purchase for example $\frac{1}{10}$ **of the cost per week for 10 weeks**.

Let's work out 5% of $30



In this example we took a **percentage** (5%) then turned it into a **fraction** ($\frac{5}{100}$) and lastly turned it into a **decimal** (0.05) by recognising the ' — ' in the fraction as the same as dividing the 2 numbers (÷).

Knowing how a fraction or percentage is written as a decimal is helpful and makes applying them much quicker and easier.

Here are some common **percentages** written as **fractions** and **decimals**:

Percentage	Fraction	Decimal
5%	$\frac{1}{20}$	0.05
10%	$\frac{1}{10}$	0.1
20%	$\frac{1}{5}$	0.2
25%	$\frac{1}{4}$	0.25
50%	$\frac{1}{2}$	0.5
75%	$\frac{3}{4}$	0.75
100%	$\frac{1}{1}$	1

Activity 3.10

1. Work out the following problems. You can use a calculator.

   a) **5%** of **$100** = _____

   b) **25%** of **$120** = _____

   c) **50%** of **$5** = _____

   d) $\frac{3}{4}$ of **10** = _____

   e) $\frac{1}{5}$ of **1000** = _____

   f) $\frac{1}{10}$ of **65** = _____

2. Match the fraction or percentage with the decimal. Write the letters on the lines.

1. _____	5%
2. _____	20%
3. _____	50%
4. _____	100%
5. _____	$\frac{1}{10}$
6. _____	$\frac{1}{4}$
7. _____	$\frac{3}{4}$

a) 0.1
b) 1
c) 0.05
d) 0.25
e) 0.75
f) 0.5
g) 0.2

Lesson 3.11 Chance and Probability

Probability is how likely it is for something to happen.

It is impossible to know for sure if something will happen, but we can work out how likely it is using probability.

For example, if you flip a coin there are 2 possible outcomes:

Heads **Tails**

We can describe the probability of the coin landing on **Heads** as $\frac{1}{2}$.

The probability of landing on **Tails** is also $\frac{1}{2}$.

We could also call this a '**50/50 chance**'.

If you roll a die there are six possible outcomes:

1 **2** **3** **4** **5** **6**

The probability of landing on any one of the faces is $\frac{1}{6}$. We would say there is a **'one in six chance'**.

We come up with these fractions by using this equation:

$$\text{Probability of something happening} = \frac{\text{Number of ways it can happen}}{\text{Total number of outcomes}}$$

For example, the probability of rolling a 4 with a die:

How many ways can it happen?
Just one – there is only one side of the die with a **4** on it.

What are the total number of outcomes?
Six – there are six sides on the die.

The probability of **rolling a 4** is $\frac{1}{6}$

Another example is if you had a bag with five marbles in it.

Four of the marbles are blue and the other marble is red.

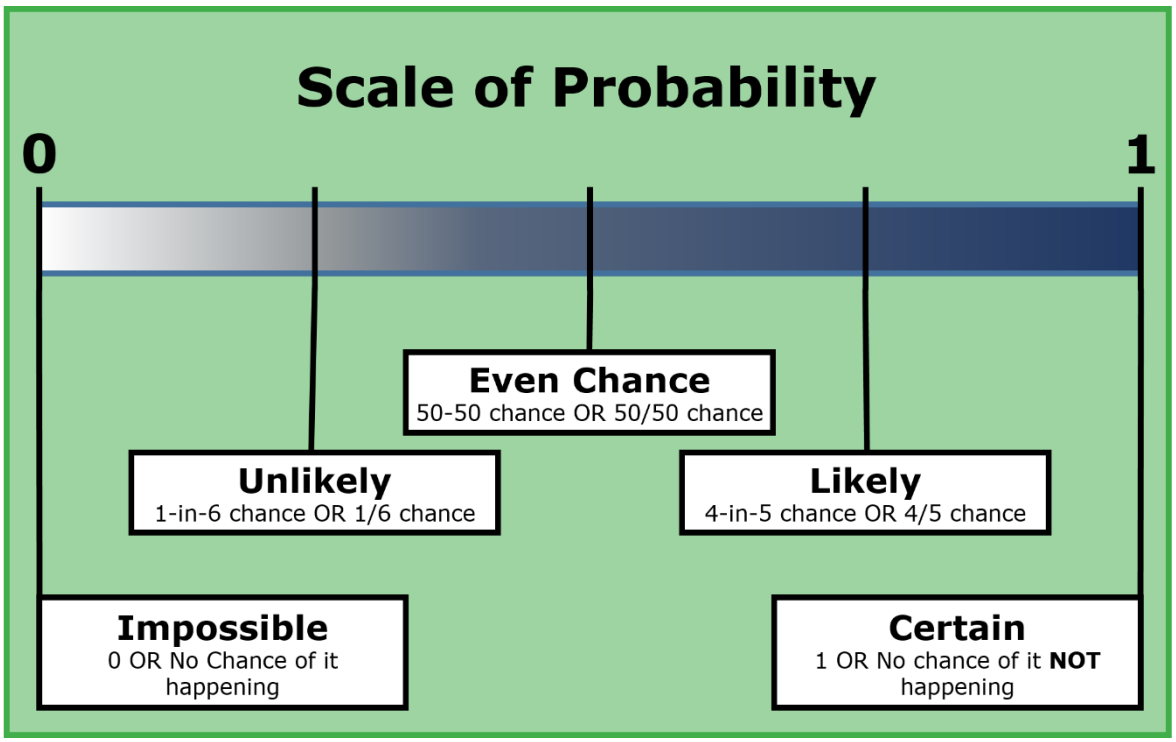
What is the probability that a blue marble will be picked from the bag?

How many ways can it happen?
Four – There are 4 blue marbles in the bag.

What are the total number of outcomes?
Five – there are five marbles in the bag.

The probability of choosing a **blue marble** is $\frac{4}{5}$

You can describe probability on a scale from **Impossible** to **Certain**.



Probability is always between 0 and 1

Remember, probability is just a guide. According to probability if you flipped a coin 100 times it would land on heads 50 times and tails the other 50 times.

However, if you actually did it you might get more of one than then other. The most likely outcome is that you will get somewhere near 50 of each but it is not certain.

Activity 3.11

1. Work out the probability of the following events:

a) Rolling a 1 or 2 on a single die.

ANSWER:

b) Rolling a 2, 4 or 5 on a single die.

ANSWER:

c) Flipping a coin and landing on heads.

ANSWER:

d) Pulling a blue marble out of a bag with 9 blue marbles and 1 red marble.

ANSWER:

e) Pulling a yellow marble out of a bag with 2 yellow marbles and 8 green marbles.

ANSWER:

2. Choose the best word to describe the probability of the following events. (Circle your answer)

a) Flipping a coin and landing on tails.

Impossible **Unlikely** **Even Chance** **Likely** **Certain**

b) Rolling a die and landing on 1, 3 or 5.

Impossible **Unlikely** **Even Chance** **Likely** **Certain**

c) Rolling a die and landing on 2.

Impossible **Unlikely** **Even Chance** **Likely** **Certain**

d) Pulling a red marble out of a bag that has 5 red marbles and 3 green marbles.

Impossible **Unlikely** **Even Chance** **Likely** **Certain**

e) Pulling a purple marble out of a bag where there are only purple marbles in the bag.

Impossible **Unlikely** **Even Chance** **Likely** **Certain**