Released November 2017

Years 5/6

Small Steps Guidance and Examples

Block 4: Statistics

White Rose Maths

Week 9 to 10 - Statistics

Overview

Small Steps

Year 5	Year 6
Read and interpret line graphs	Read and interpret line graphs
Draw line graphs	Draw line graphs
Use line graphs to solve problems	Use line graphs to solve problems
	Circles
Read and interpret tables	Read and interpret pie charts
Two way tables	Pie charts with percentages
Timetables	Draw pie charts
	The mean

Read & Interpret Line Graphs

Notes and Guidance

Children are introduced to line graphs. They use their knowledge of scales to read information accurately. They look at effective ways to read a line graph and answer questions relating to the graphs. Children use data in different real life contexts.

Mathematical Talk

What do you notice about the scale on the vertical axis?

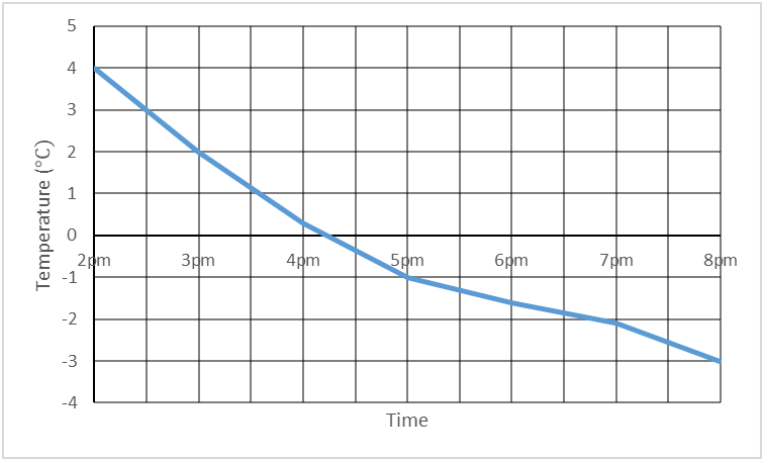
What would happen if you used a different scale?

Can you think of two questions to ask each other about your graph?

Where have you seen information presented in line graphs? Is it clear?

Varied Fluency

1



What was the lowest temperature recorded on the graph?

What was the time when freezing point was reached?

Can you estimate what the temperature was at 6pm?

The temperature was below 0°C for ____ hours.

Read & Interpret Line Graphs

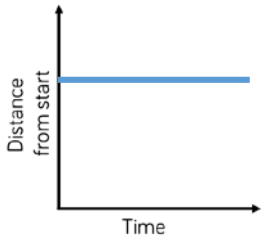
Reasoning and Problem Solving

The graph shows how many cars were sold by two different companies in the first 5 months of 2017. Blue represents Ace Motors and red represents Briggs.

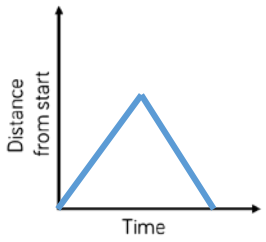
- How many more cars did Ace Motors sell than Briggs in April?
- For the first 3 months of the year compare the total sales for each company. Who sold more and by how many?
- Crooks Motors sold 250 more cars than Briggs each month. Plot their sales on the graph.

2,000
Ace 5,500
Briggs 4,500
Difference of 1,000
Ace sold more.
Points on graph are all half an interval up from briggs.

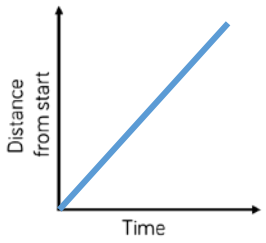
Match the graph to the activity.



A car travels at constant speed on the motorway.



A car is parked outside a house.



A car drives to the end of the road and back.

The first graph matches with the second statement.

Second graph with the third statement.

Third graph with the first statement.

Read and Interpret Line Graphs

Notes and Guidance

Children will build on their experience of interpreting data in context from Year 5, using their knowledge of scales to read information accurately.
Although example graphs are given, it would be useful if children can see real data from across the curriculum. It is worth noting that line graphs represent continuous data not discrete data.
Children need to explore effective ways to read the information accurately, including where more than one set of data is on the same graph.

Mathematical Talk

Where might you see a line graph used in real life?

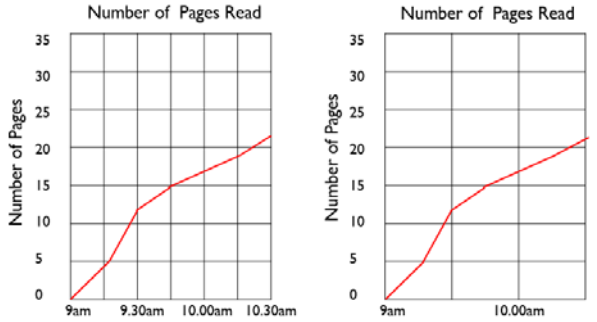
Why is the 'Water Consumption' graph more difficult to interpret?

How can you make sure that you read the information accurately?

Varied Fluency

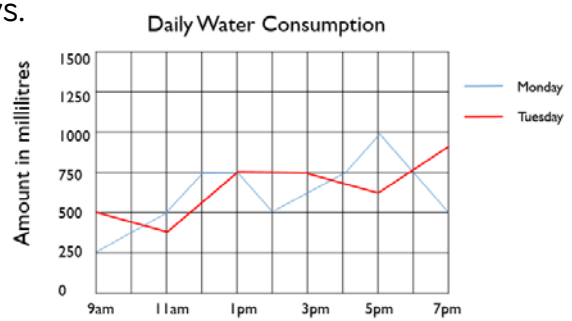
1

What is the same and what is different about the 2 graphs?



2

Here is a graph showing daily water consumption over two days.

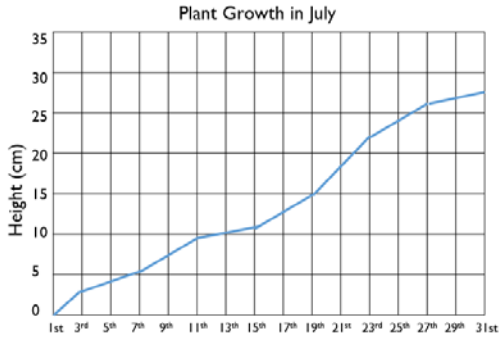


At what times of the day was the same amount of water consumed on Monday and Tuesday?
Was more water consumed on Monday or Tuesday morning? How much more?

Read and Interpret Line Graphs

Reasoning and Problem Solving

Jill has created a graph to track the growth of a plant in her house.



Jill recorded the following facts about the graph.

a) On the 9th of July the plant was about 9 cm tall.

b)Between the 11th and 19th July the plant grew 5 cm.

c)At the end of the month the plant was twice as tall as it had been on the 13th.

Can you spot and correct Jill's mistakes?

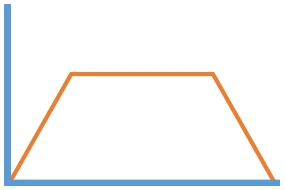
a) On the 9th July a more accurate measurement would be 7.5 cm.

b) Correct.

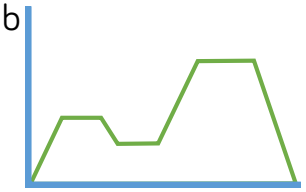
c) On the 31st the plant was approximately 28 cm tall, but on the 13th it was only 10 cm which is not half of 28 cm. The plant was closer to 14 cm on the 17th July.

Write a story and 3 questions for each of the 3 graphs below.

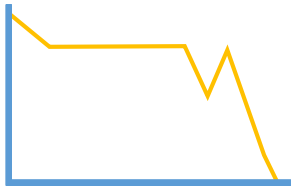
a



b



c



Possible context for each story:

a) A car speeding up, travelling at a steady speed, then slowing down.

b) A bike ride where the speed varies due to the terrain.

c) The outside temperature on a winters day.

Draw Line Graphs

Notes and Guidance

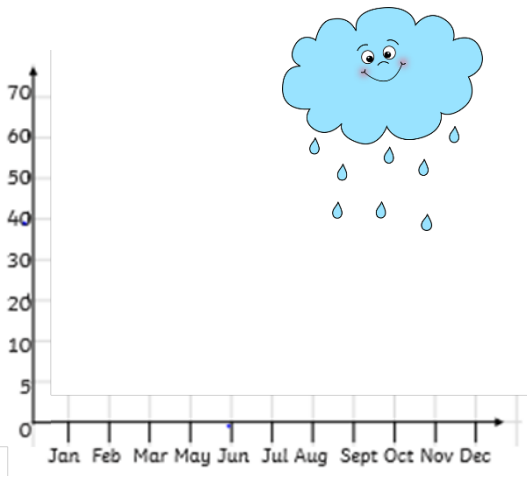
Children use their knowledge of scales and coordinates to represent data as a line graph.
Drawing line graphs is a Year 5 Science objective and has been included here to support this learning and link to reading and interpreting graphs.
Children draw axis with different scales depending on the data they are representing.

Mathematical Talk

What intervals will you use?
What will each square represent?
What does the x axis represent?
What does the y axis represent?
Why are line graphs useful?
What makes them different to other types of graphs?
What data could we collect?

Varied Fluency

1 The table shows average rainfall in Leicester over a year. Complete the graph below using the information from the table.



Month	Rainfall (mm)
January	54
February	40
March	38
April	38
May	48
June	46
July	58
August	60
September	50
October	57
November	65
December	50

2 Here is a table showing the conversion between pounds and rupees. Put the information into a line graph.

x- axis £	1	2	3	4	5	6	7	8	9	10
y –axis rupees	80	160	240	320	400	480	560	640	720	800

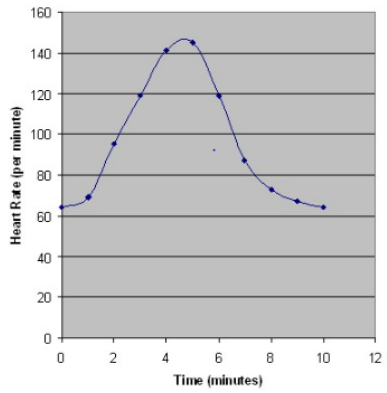
Draw Line Graphs

Reasoning and Problem Solving

This would be a good opportunity to collect your own data and draw a line graph to display the results.
As this objective is taken from the science curriculum, it would be a good idea to link it to this or PE.

- Measuring shadows over time
- Melting and dissolving substances
- Plant growth

Here is a line graph showing the effect that exercise had on Jimmy's heart during Monday's PE lesson.



Draw the graph again using different intervals so that you can gather more accurate information from it.
What was Jimmy's heart rate at 1min 15secs?
At what time was Jimmy's heart rate 130 beats per minute?

What can the children interpret from the graph? Can they answer those questions exactly?

Discuss the effective of almost zooming in on the graph. Why would this be helpful?

They don't need to start at 0 as the first piece of information is bigger than 60.

Draw Line Graphs

Notes and Guidance

Children will build on their experience of reading and interpreting data in order to draw their own line graphs.

Although example contexts are given, it would be useful if children can see real data from across the curriculum.

Children will need to decide on the most appropriate scales and intervals to use depending on the data they are representing.

Mathematical Talk

What will the x axis represent? What intervals will you use?

What will the y axis represent? What intervals will you use?

How will you make it clear which line represents which set of data?

Why is it useful to have both sets of data on one graph?

Varied Fluency

1

This table shows the height a rocket reached between 0 and 60 seconds.

Create a line graph to represent the information.

Time (seconds)	Height (metres)
0	0
10	8
20	15
30	25
40	37
50	50
60	70

2

The table below shows the population in the UK and Australia from 1990 to 2015.

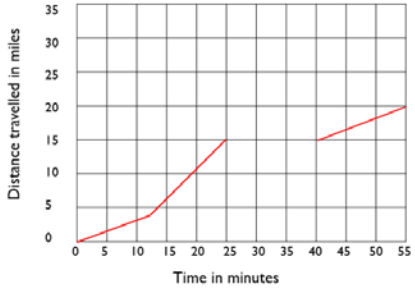
	1990	1995	2000
UK	57,200,000	58,000,000	58,900,000
Australia	17,000,000	18,000,000	19,000,000
	2005	**2010**	**2015**
UK	60,300,000	63,300,000	65,400,000
Australia	20,200,000	22,100,000	23,800,000

Create one line graph to represent the population in both countries. Create three questions to ask your friend about your completed graph.

Draw Line Graphs

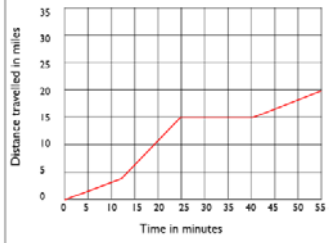
Reasoning and Problem Solving

This graph shows the distance a car travelled.

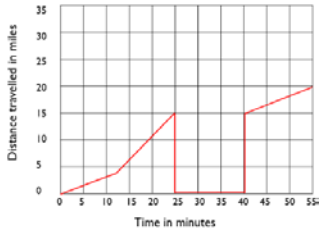


Kim and Rory were asked to complete the graph to show the car had stopped.
Here are their completed graphs.

Kim:



Rory:



Who has completed the graph correctly?
Explain how you know.

Kim has completed the graph correctly. The car has still travelled 15 miles in total, then stopped for 15 minutes before carrying on.

This table shows the distance a lorry travelled during the day.

Time	Distance in miles
7.00 am	10
8.00 am	28
9.00 am	42
10.00 am	58
11.00 am	70
12.00 am	95
1.00 pm	95
2.00 pm	118

Create a line graph to represent the information where the divisions along the x axis are 2 hourly.
Create a second line graph where the divisions along the x axis are 1 hourly.
Compare your graphs, which graph is more accurate?
Would a graph with divisions at each half hour be even more accurate?

Children may find that the second line graph is easier to draw and interpret as it matches the data given directly. They may discuss that it would be difficult to draw a line graph showing half hour intervals, as we cannot be sure the distance travelled at each half hour.

Problems with Line Graphs

Notes and Guidance

Children will use line graphs to solve problems. They may use prepared graphs and also graphs which they have drawn themselves, and will make links to other subjects, particularly science.

They need to consider comparison, sum and difference problems.

Mathematical Talk

How is the information organised?

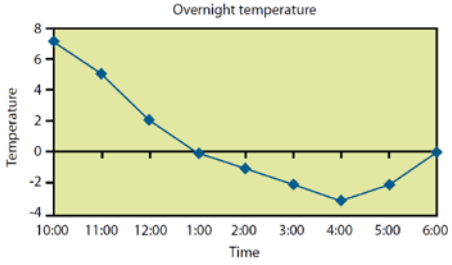
Is it clear?

What else does this graph tell you?

What does it not tell you?

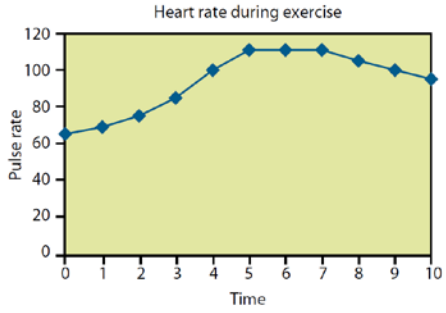
Varied Fluency

1 Use the line graph to answer the following questions.



What was the highest/lowest temperature? What time did they occur?
What is the difference between the highest and lowest temperature?
How long did the temperature stay at freezing point or less?

2



How long did it take for the pulse rate to reach the highest level? Explain using the graph to help.
When do you think the person stopped exercising? Convince me.

Estimate what the pulse rate was after 2 and a half minutes. How did you get an accurate estimate?

Problems with Line Graphs

Reasoning and Problem Solving

Carry out your own exercise experiment and record your heart rate on a graph like the one shown in the section above. How does it compare?

Can you make a set of questions for a friend to answer about your graph?

Can you put the information into a table?

Open ended answers.

Children can be supported by being given part-drawn line graphs.

Here is a line graph showing a bath time. Can you write a story to explain what is happening in the graph?

How long did it take to fill the bath?

How long did it take to empty?

Why is there a difference?

What happened when the height of water reached around 16cm?

Discussions around what happens to the water level when someone gets in the bath would be useful.

8 mins to fill the bath

4 mins to empty

One or two taps could be used to fill.

Steady rate of flow to empty

Someone got in the bath so the water level was raised.

Use Line Graphs to Solve Problems

Notes and Guidance

Once children can read, interpret and draw lines graphs they need to be able to use line graphs to solve problems.

Children need to use their knowledge of scales to read information accurately. They need to be exposed to graphs that have more than one set of data.

At this point, children should be secure with the terms x and y axis, frequency and data.

Mathematical Talk

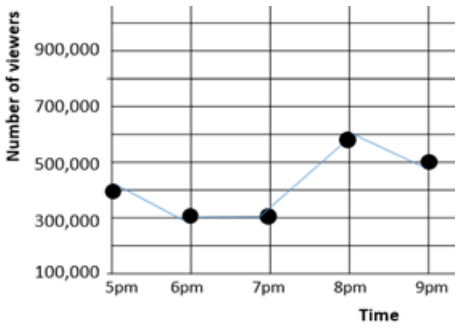
What do you notice about the scale on the vertical axis?
What other scale could you use?

How is the information organised? Is it clear?
What else does this graph tell you? What does it not tell you?

How can you calculate _____?
Why would this information be placed on a line graph and not a different type of graph?

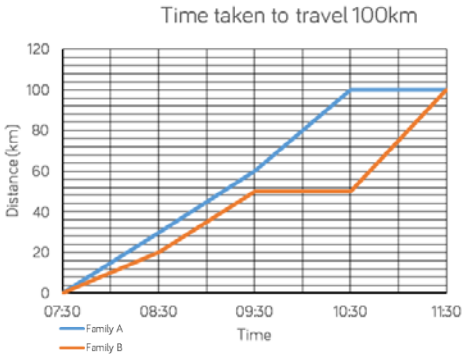
Varied Fluency

1 Fred and Joanne watched the same channel, but at different times. Fred watched 'Chums' at 5pm. Joanne watched 'Countup' at 8pm.



What was the difference between the number of viewers for each programme?
What was the difference in viewers between 6pm and 8pm?
Which time had twice as many viewers than 6pm?

2 Two families were travelling to Bridlington for their holidays. They set off at the same time but arrived at different times.

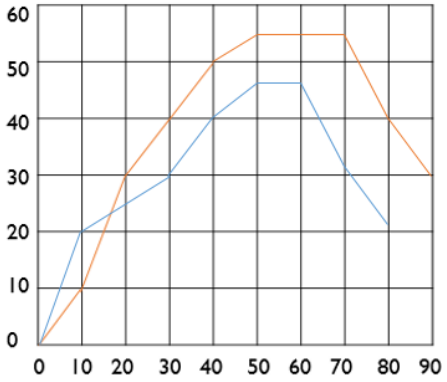


What time did family A arrive?
How many km had each family travelled at 08:45?
Which family stopped midway through their journey?
How much further had they left to travel?

Use Line Graphs to Solve Problems

Reasoning and Problem Solving

What could this graph be showing?



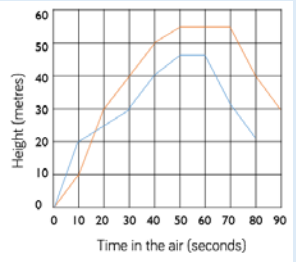
Label the axis to show this.

Is there more than one way to label the axis?

Possible response:

This graph shows the height of a drone and the time it was in the air.

For example:



The graph below shows some of Mr Woolley's journeys.

What is the same and what is different about each of these journeys?

What might have happened during the yellow journey?

Possible responses:

All the journeys were nearly the same length.

The journeys all took different lengths of time.

The black and blue journey were travelling at constant speeds but black was travelling quicker than blue.

During the yellow journey, Mr Woolley might have been stuck in traffic. This might explain why the time increases but the length of the journey doesn't.

Circles

Notes and Guidance

Children will illustrate and name parts of circles, using the words radius, diameter, centre and circumference confidently.

They will also explore the relationship between the radius and the diameter and recognise the diameter is twice the length of the radius.

Mathematical Talk

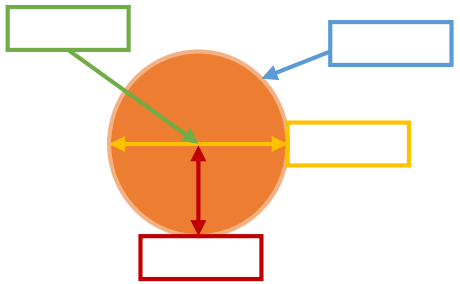
Why is the centre important?

What is the relationship between the dimeter and the radius? If you know one, how can you calculate the other?

Can you think of real life situations where you may need to use this maths?

Varied Fluency

1 Using the labels complete the diagram:



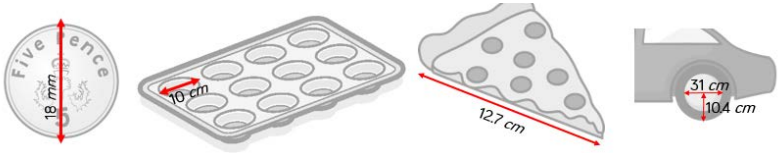
Radius

Diameter

Centre

Circumference

2 Find the radius or the diameter for each object below:



The radius is ___The diameter is ___ I know this because ___

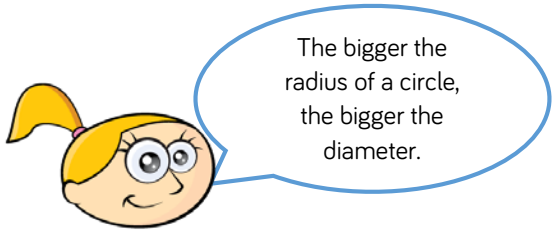
3 Complete the table:

Radius	Diameter
26 cm	
	37 mm
2.55 m	
	99 cm
	19.36cm

Circles

Reasoning and Problem Solving

Stephanie says:



Do you agree? Explain your reasoning.

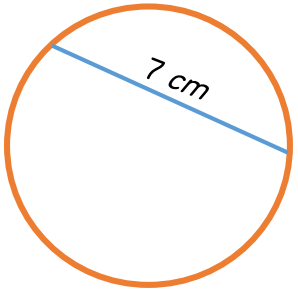
Answer:

I agree with Stephanie because the diameter is twice the length of the radius.

Spot the mistake!

Ross has measured and labelled the diameter of the circle below.

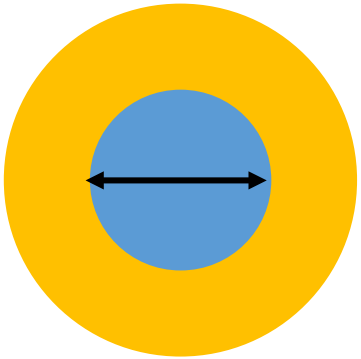
He thinks that the radius of this circle will be 3.5 cm.



Is Ross right? Explain why.

Answer: Ross has measured the diameter inaccurately because the diameter always goes through the centre of the circle from one edge to another.

Here are 2 circles. Circle A is orange; Circle B is blue. The diameter of Circle A is $^{3}/_{4}$ the diameter of Circle B.



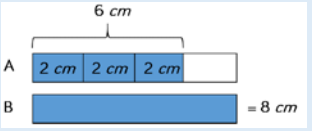
If the diameter of Circle A is 6cm, what is the diameter of Circle B?

If the diameter of Circle A is 6cm, what is the radius of Circle B?

If the diameter of Circle B is 16cm, what is the diameter of Circle A?

If the diameter of Circle B is 16cm, what is the radius of Circle A?

Answers: This problem can be solved using a bar model.



a) 8 cm

b) 4 cm

c) 12 cm

d) 6 cm

Read & Interpret Tables

Notes and Guidance

Children will extract information from tables and apply previously learned skills to manipulate information.

There are many opportunities to link this to the local area or topics being studied by the class.

This step provides good opportunities to add and subtract larger numbers in meaningful contexts.

Mathematical Talk

Can you find the information on the table?

Can you make up your own question to ask about the table?

Varied Fluency

1 Use the table to answer the questions.

Planet	Distance from the Sun (millions of kilometers)	Time for Revolution (Earth units)	Diameter at Equator (kilometers)	Time for Rotation (Earth units)
Mercury	58	88 days	4,878	59 days
Venus	108	225 days	12,104	243 days
Earth	150	365 days	12,756	24 hours
Mars	228	687 days	6,794	25 hours
Jupiter	778	12 years	142,984	10 hours
Saturn	1,433	29 years	120,536	11 hours
Uranus	2,871	84 years	51,118	17 hours
Neptune	4,497	165 years	49,500	17 hours

- How many planets take more than one day to rotate?
- Which planets take more than one year to make one revolution?
- Write the diameter of Jupiter in words.
- Make up some questions for a friend to answer

2 Answer the questions using information from the tables.

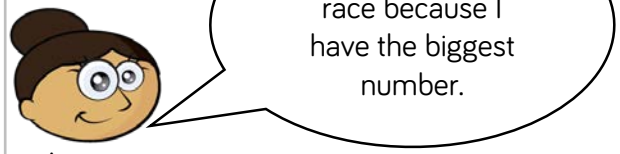
City	Leeds	Wakefield	Bradford	Liverpool	Coventry
Population	720,000	316,000	467,000	440,000	305,000

- What is the difference between the highest and lowest population?
- Which two cities have a combined population of 621,000?

Read & Interpret Tables

Reasoning and Problem Solving

	100m sprint (seconds)	Shot put (m)	50m Sack Race (seconds)	Javelin (m)
Stephen	15.5	6.5	18.9	11.2
Julie	16.2	7.5	20.1	13.3
Fred	15.8	6.9	19.3	13.9
Chris	15.6	7.2	18.7	14.1
Laura	17.9	6.3	18.7	13.3



Laura

Is Laura correct?

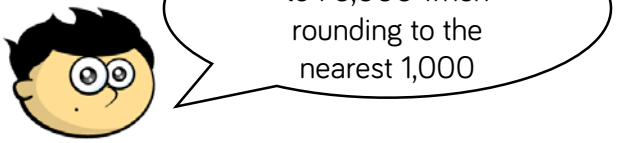
Explain your answer.

No, she has the highest number which means she took the longest so she came last.

Stadium	City	Country	Capacity
Camp Nou	Barcelona	Spain	99,365
Wembley Stadium	London	England	90,000
Signal Iduna Park	Dortmund	Germany	81,359
Estadio Santiago Bernabeu	Madrid	Spain	81,044
San Siro	Milan	Italy	80,018
Stade de France	Paris	France	80,000
Luzhniki Stadium	Moscow	Russia	78,300
Ataturk Olimpiyat Stadium	Istanbul	Turkey	76,092
Old Trafford	Manchester	England	75,811
Allianz Arena	Munich	Germany	75,000

True or false?

- The fourth largest stadium is The San Siro
- There are 6 stadiums with a capacity of more than 80,000
- Three of the largest stadiums are in England



Joe

Is Joe correct? Explain your answer.

False – it's fifth

False - 5 are more. 1 is exactly 80,000

False - 2 are

No, two stadiums do.

Read and Interpret Pie Charts

Notes and Guidance

Children will build on their understanding of circles to start interpreting pie charts. They will understand how to calculate fractions of amounts to interpret simple pie charts.

Children should understand what the whole of the pie chart represents and use this when solving problems.

Mathematical Talk

What does the whole pie chart represent? What does ____ segment represent?

Do you recognise any of the fractions? How can you use this to help you?

What's the same and what's different about the favourite drinks pie charts?

What other questions could you ask about the pie chart?

Varied Fluency

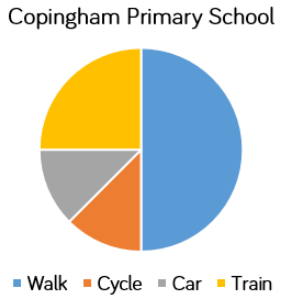
1 There are 600 pupils at Copingham Primary school. Work out how many pupils travel to school by:

a) Train

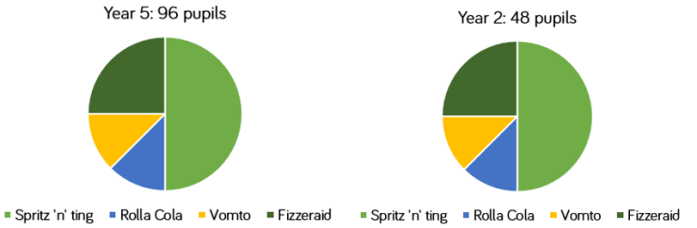
b) Car

c) Cycling

d) Walking



2 Classes in Year 2 and Year 5 were asked what their favourite drink was. Here are the results:



What fraction of pupils in Year 5 chose Fizzeraid?

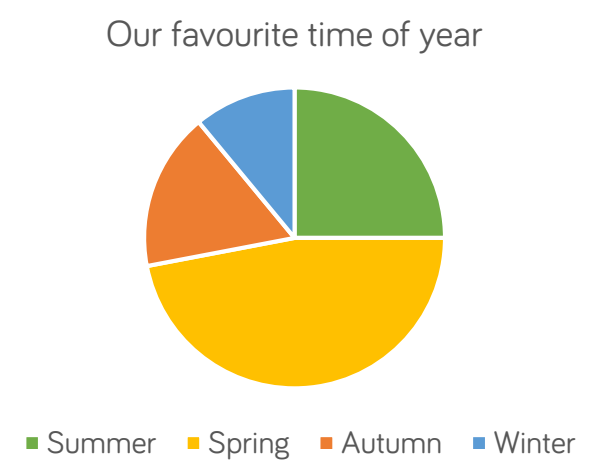
How many children in Year 2 chose Rolla Cola?

How many more children chose Vomto than Spritz 'n' ting in Year 2?

Read and Interpret Pie Charts

Reasoning and Problem Solving

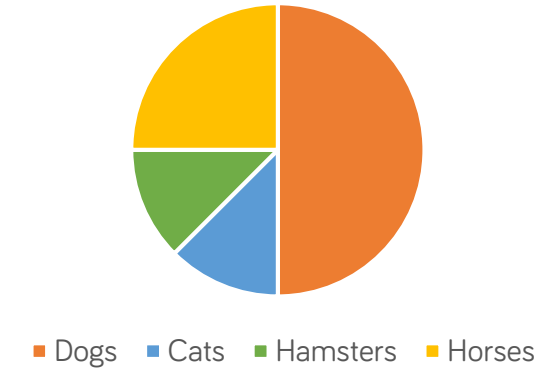
In a survey people were asked what their favourite season of the year was, the results are shown in the pie chart below.
If 47 people voted spring, how many people took part in the survey?



Explain your method.

Answer:
Spring is a quarter of the whole pie chart and there are 4 quarters in a whole, so
$47 \times 4 = 188$
people in total.

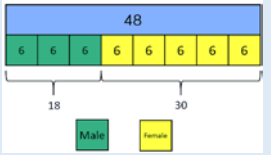
96 people took part in this survey.



How many people voted for cats?
$^3/_8$ of the people who voted for dogs were male. How many females voted for dogs?
What other information can you gather from the pie chart?
Write some questions about the pie chart for your partner to solve.

Answers:
$^1/_2$ of 96 = 48,
$^1/_4$ of 96 = 24,
$^1/_8$ of 96 = 12
12 people voted cats.

48 people voted dogs.
$^1/_8$ of 48 = 6
$6 \times 5 = 30$.
30 females voted.



Two Way Tables

Notes and Guidance

Children read a range of two-way tables where the data is represented in various ways.

These tables show two different sets of data which are displayed horizontally and vertically.

Children show they can interpret a two-way table by creating questions themselves.

Mathematical Talk

What does the table show?

What information is missing?

How can we calculate the missing information?

How else could this data be represented?

Varied Fluency

1

This two way table shows the staff at Liverpool police station.

	Male	Female	TOTAL
Constable	55	24	79
Sergeant	8	5	13
Inspector	2	4	6
Chief Inspector	1	1	2
TOTAL	66	34	100

- How many female inspectors work there?
- How many male sergeants work there?
- How many constables are there altogether?
- How many people work at Liverpool police station?
- How many male inspectors and female constables are there altogether?
- How many people in total are ranked below inspector?

2

This table shows how many football games teams have won and lost. Fill in the totals and write your own questions to interpret the information.

	Man United	Liverpool	Chelsea	TOTAL
Lost	36	42	29	
Won	174	76	126	
TOTAL				

Two Way Tables

Reasoning and Problem Solving

This table shows how many children own dogs and cats.

Fill in the missing gaps and answer the questions below.

	Boys	Girls	TOTAL
Dogs		44	
Cats	38		
TOTAL	125		245

- How many more boys have dogs than girls?
- How many more girls have cats than dogs?
- How many more children have dogs than cats?

	Boys	Girls	TOTAL
Dogs	87	44	131
Cats	38	76	114
TOTAL	125	120	245

- 43
- 32
- 17

120 people were asked where they went on holiday during the summer months of last year. Use this information to create a two way table.

In June, 6 people went to France, 18 went to Spain and 5 went elsewhere.
In July, 10 people went to France, 19 went to Italy and 2 went elsewhere.
In August,15 people went to Spain.
33 people went to France altogether.
29 people went to Italy altogether.
35 people went away in June.
43 people went on holiday in August.

You can choose to give children a blank template.
Children may not know where to put the 120, or to realise its importance.
Children will need to work systematically in order to get all of the information.
As a teacher, you could choose not to give the children the complete total and let them find other possible answers.

Pie Charts With Percentages

Notes and Guidance

Children will apply their understanding of calculating percentages of amounts to interpret pie charts.

Children will build on their understanding of what the whole pie chart represents and know that the whole totals 100%.

Encourage children to continue making links to known and recognisable fractions in order to read the pie chart more efficiently.

Mathematical Talk

How did you calculate the percentage? What fraction knowledge did you use?

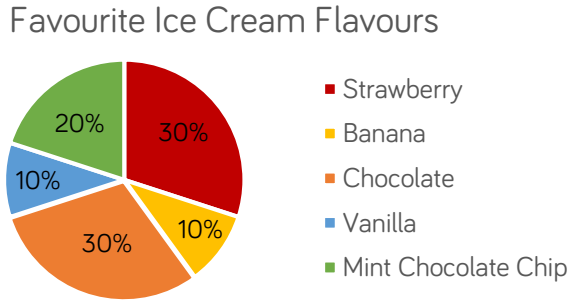
How else could you find the difference between Chocolate and Mint Chocolate?

If you know 5% of a number, how can you work out the whole number?

If you know what 5% is, what else do you know?

Varied Fluency

1 150 children voted for their favourite ice cream flavours. Here are their results:



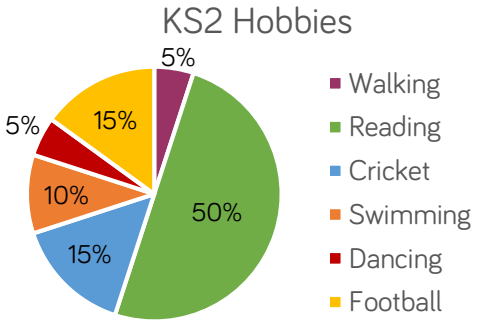
How many people voted for Vanilla?

How many more people voted for Chocolate than Mint Chocolate chip?

How many people chose Chocolate, Banana and Vanilla altogether?

2 There are 200 pupils in Key Stage 2 who chose their favourite hobbies.

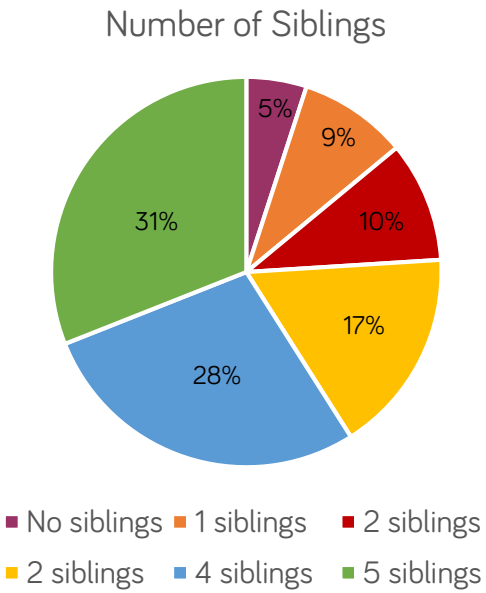
How many pupils chose each hobby?



Pie Charts With Percentages

Reasoning and Problem Solving

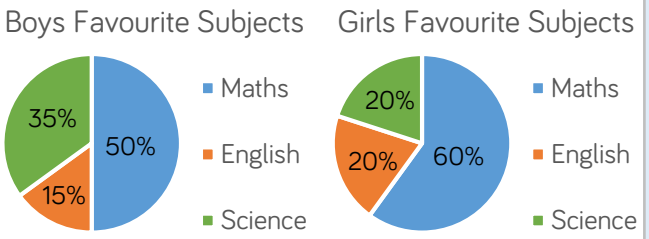
13 people in this survey have no siblings. Use this information to work out how many people took part in the survey altogether.



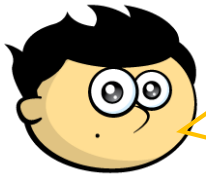
Now work out how many people each segment of the pie chart is worth. Can you represent the information in a table?

No siblings	13
1 sibling	22
2 siblings	26
3 siblings	45
4 siblings	73
5 siblings	81
Total	260

120 boys and 100 girls were asked which was their favourite subject. Here are the results:



Craig says:



More girls prefer Maths than boys because 60% is bigger than 50%.

Do you agree? Explain why.

Answer:

Craig is incorrect because the same amount of girls and boys like maths.

Boys:

50% of 120 = 60

Girls:

60% of 100 = 60

Timetables

Notes and Guidance

Children need to extract information from timetables. Where possible it is useful to look at real timetables of public transport in the local area.

Allow children plenty of time to examine the timetables and ask each other questions about the information.

Mathematical Talk

How often does a bus leave ____ station?
How many buses leave each hour?
Where do you see timetables and why are they useful?
What information is displayed in a row when you read across the timetable?
What information is displayed in a column when you read down the timetable?

Varied Fluency

1 Use the timetable to answer the questions.

	Bus Timetable				
Halifax Bus Station	06:05	06:35	07:10	07:43	08:15
Shelf Roundabout	06:15	06:45		07:59	08:31
Shelf Village Hall	06:16	06:46	07:23	08:00	08:32
Woodside	06:21	06:50	07:28		
Odsal	06:26	06:55	07:33	08:15	08:45
Bradford Interchange	06:40	07:10	07:48	08:30	09:00

- On the 06:35 bus, how long does it take to get from Shelf Roundabout to Bradford Interchange?
- Can you travel to Woodside on the 07:43 bus?
- Which journey takes the longest time between Shelf Village Hall and Bradford Interchange, the bus that leaves SVH at 06:46 or the bus that leaves SVH at 07:23?
- If you needed to travel from Halifax Bus Station to Odsal and had to arrive by 08:20, which would be the best bus to catch? Explain your answer.
- Which journey takes the longest time from Halifax Bus Station to Bradford Interchange?

Timetables

Reasoning and Problem Solving

NatureWatch		NatureWatch +1		QuizTime		Cookery Channel	
5pm	News	5pm	Puppy playtime	5pm	Talk the Talk	5pm	Cheese Please
5:30pm	Weather	6pm	News	5:30pm	Quizdom	6pm	Cook with Lydia
5:45pm	Deep Blue	6:30pm	Weather	6pm	What's the Q?	6:30pm	Pizza Pasta Pietro
6pm	Pampered Pets	6:45pm	Deep Blue	6:30pm	aMAZEment	6:45pm	5 Minute Menu
7pm	Safari	7pm	Pampered Pets	7:30pm	Buzzed Out	7pm	Budget Baker
8:15pm	Animal Antics	8pm	Safari	8pm	Guess the Noise	8pm	Lots of Lollies
9:15pm	Worldly Wonders	9:15pm	Animal Antics	9pm	Dance & Decide	9:15pm	Biscuit Bites

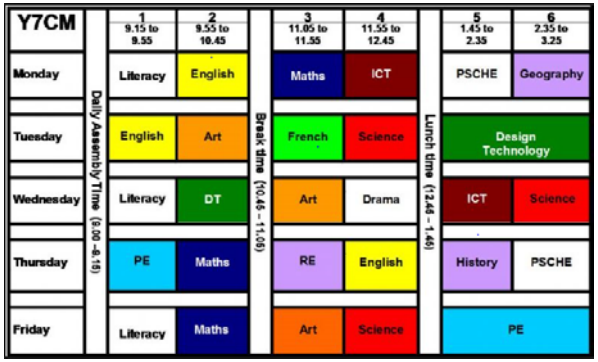
Simon scans the TV guide and plans his viewing for the evening. He chooses this sequence of TV shows:
Cheese Please, What's the Q, aMAZEment, Budget Baker, Safari, Dance & Decide.
Will Simon be able to watch all the shows he has chosen?

True or False – Safari, Guess the Noise and Lots of Lollies are all on for 1 hour.

No, Budget Baker clashes with aMAZEment.

False – Safari is on for over an hour.

Here is Becky's weekly timetable from secondary school.



Y7CM	1 9.15 to 9.55	2 9.55 to 10.45	3 11.05 to 11.55	4 11.55 to 12.45	5 1.45 to 2.35	6 2.35 to 3.25
Monday	Literacy	English	Maths	ICT	PSCHE	Geography
Tuesday	English	Art	French	Science	Design Technology	
Wednesday	Literacy	DT	Art	Drama	ICT	Science
Thursday	PE	Maths	RE	English	History	PSCHE
Friday	Literacy	Maths	Art	Science	PE	

Daily Assembly Time (9.00 – 9.15)

Break time (10.45 – 11.05)

Lunch time (12.45 – 1.45)

True or false:

- If Becky was 10 minutes late for her English lesson on Monday there would be 45 mins of the lesson left.
- Becky has 2 hours and 20 minutes of PE in a week
- Becky has 130 minutes of literacy in a week

False, 40 mins

True

False, 120mins (2 hours)

Draw Pie Charts

Notes and Guidance

Pupils will build on their understanding of angles around a point totalling 360 degrees and make connections to this representing 100% of the data within a pie chart. They will convert data into degrees using their factors and multiplication skills.

From this, they will construct a pie chart, using their protractor skills.

Mathematical Talk

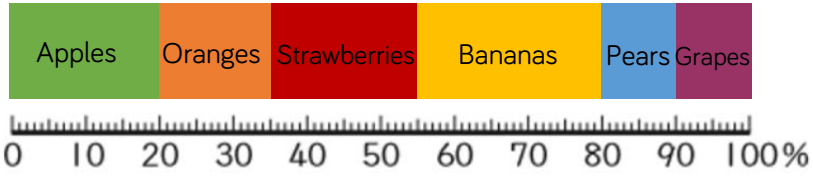
How many degrees in a circle? How will this help us construct a pie chart?

If the total frequency is ____, how will we work out the number of degrees?

If 180° represents 15 pupils. How many people took part in the survey? Explain why.

Varied Fluency

1 Construct a pie chart using the percentage bar model.



2 A survey was conducted to show how children in class 6 travelled to school Draw a pie chart to represent the data.

Type of transport	Number of children	Convert to degrees
Car	12	12 × 10 = 120°
Bike	7	7 × 10 = 70°
Walk	8	8 × 10 = 80°
Bus	5	5 × 10 = 50°
Scooter	4	4 × 10 = 40°
TOTAL =	36	360°

Draw Pie Charts

Reasoning and Problem Solving

A survey was conducted to work out Year 6's favourite sport. Work out the missing information and then construct a pie chart.

Favourite Sport	Number of Children	Convert to Degrees
Football	10	
Tennis	18	
Rugby		___ × 6 = 90°
Swimming	6	6 × 6 = 36°
Cricket		___ × 6 = 42°
Golf	4	4 × 6 = 24°
Total	60	360°

Children will then use this to draw a pie chart.

Favourite Sport	Number of Children	Convert to Degrees
Football	10	10 × 6 = 60°
Tennis	18	18 × 6 = 108°
Rugby	15	15 × 6 = 90°
Swimming	6	6 × 6 = 36°
Cricket	7	7 × 6 = 42°
Golf	4	4 × 6 = 24°
Total	60	360°

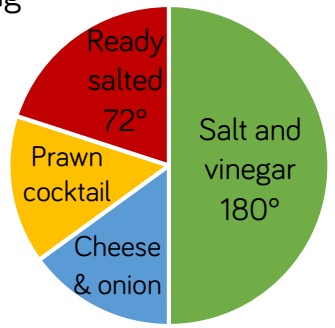
A restaurant was working out which Sunday dinner was the most popular. Use the data to construct a pie chart.

Dinner Choice	Frequency	Convert to degrees
Chicken	11	
Pork	8	
Lamb	6	
Beef	9	
Vegetarian	6	
Total	40	360°

Children will then use this table to draw a pie chart.

Dinner Choice	Frequency	Convert to degrees
Chicken	11	11 × 9 = 99°
Pork	8	8 × 9 = 72°
Lamb	6	6 × 9 = 54°
Beef	9	9 × 9 = 81°
Vegetarian	6	6 × 9 = 54°
Total	40	360°

Miss Jones is carrying out a survey in class about favourite crisp flavours. 15 pupils chose salt and vinegar. How many fewer people chose ready salted?



15 pupils = 180°

180 ÷ 15 = 12

12° = 1 pupil

72 ÷ 12 = 6 pupils

15 - 6 = 9

9 fewer students chose ready salted over salt and vinegar.

The Mean

Notes and Guidance

Children will apply their addition and division skills to calculate the mean as an average in a variety of contexts.

Once children understand how to calculate the mean of a simple set of data, allow children time to investigate working out possible and missing data when given the mean.

Mathematical Talk

What would the total be? If we know the total, how can we calculate the mean?

Do you think calculating the mean age of the family is a good indicator of their actual age? Why?

When will the mean be useful in real life?

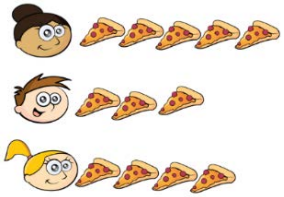
Varied Fluency

1 Here is a method to find the mean.

No of glasses of juice drunk by 3 friends	Total glasses of juice drank:	If each friend drank the same no of glasses
	9	

We say the average number of glasses of juice drank by each friend is 3. We call this average the 'mean'.

Use this method to calculate the mean average for the number of slices of pizza eaten by each child.



2 Calculate the mean number of crayons:

Crayon colour	Amount
Blue	14
Green	11
Red	10
Yellow	9

3 Hassan is the top batsman for the cricket team. His scores over the year are: 134, 60, 17, 63, 38, 84, 11

Calculate the mean number of runs Hassan scored.

The Mean

Reasoning and Problem Solving

The mean number of goals scored in 6 football matches was 4.
Use this information to calculate the missing number of goals:

Match number	Number of goals
1	8
2	4
3	6
4	2
5	1
6	___

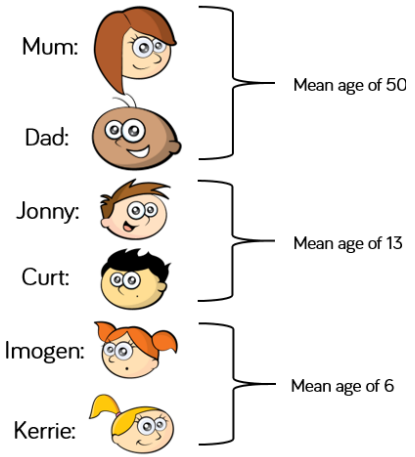
The mean number of goals scored by 3 teams was 2. How many could each team have scored? Can you find at least 10 possible solutions?

Answer: The missing number of goals is 3.

Possible solutions for each team:

1	6	0	0	5	0	1	4	0	2	4	1
2	0	6	0	1	5	0	2	4	0	1	4
3	0	0	6	0	1	5	0	2	4	1	1

Work out the age of each member of the family if:
Mum is 48 years old.
Jonny is 4 years older than Curt and 7 years older than Imogen.



Calculate the mean age of the whole family.

Answer: