

Year 5

Small Steps Guidance and Examples

Block 3 – Statistics

White Rose Maths

Overview

Small Steps

NC Objectives

- Read and interpret line graphs
- Draw line graphs
- Use line graphs to solve problems
- Read and interpret tables
- Two way tables
- Timetables

Solve comparison, sum and difference problems using information presented in a line graph.

Complete, read and interpret information in tables including timetables.

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?

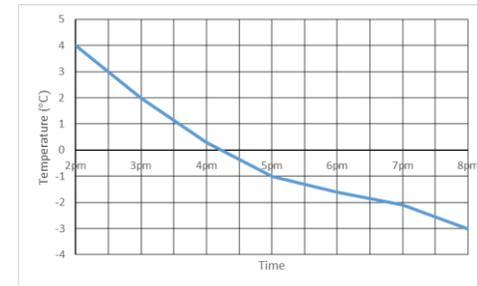
Can you think of two questions to ask each other about your graph?

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

Varied Fluency

1

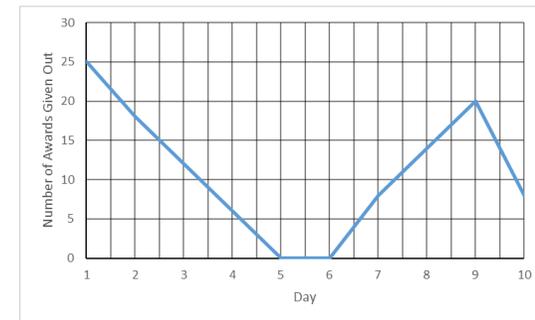
What was the lowest temperature recorded on the graph?
 What was the time when freezing point was reached?



Can you estimate what the temperature was at 6pm?
 The temperature was below 0°C for ____ hours.

2

How many children got the award on day 9?
 How many more children got the award on day 1 than on day 7?

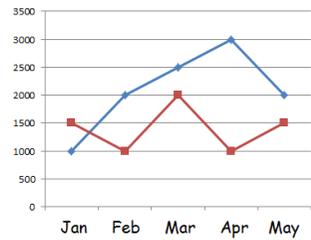


How many awards were handed out altogether over the first 5 days?
 Which days were no awards given out?
 Can you write some questions for your friends to answer?

Read & Interpret Line Graphs

Reasoning and Problem Solving

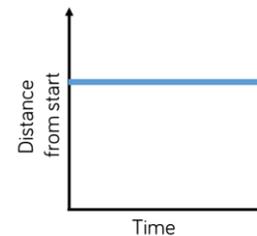
The graph shows how many cars were sold by two different companies in the first 5 months of 2017. Blue represents Ace Motors and red represents Briggs.



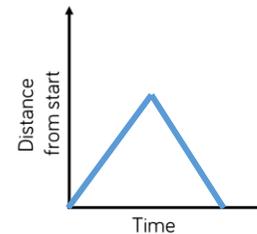
- How many more cars did Ace Motors sell than Briggs in April?
- For the first 3 months of the year compare the total sales for each company. Who sold more and by how many?
- Crooks Motors sold 250 more cars than Briggs each month. Plot their sales on the graph.

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.

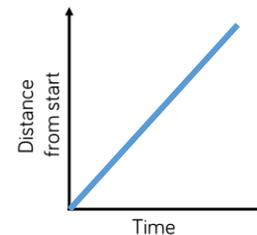
Match the graph to the activity.



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.

Draw Line Graphs

Notes and Guidance

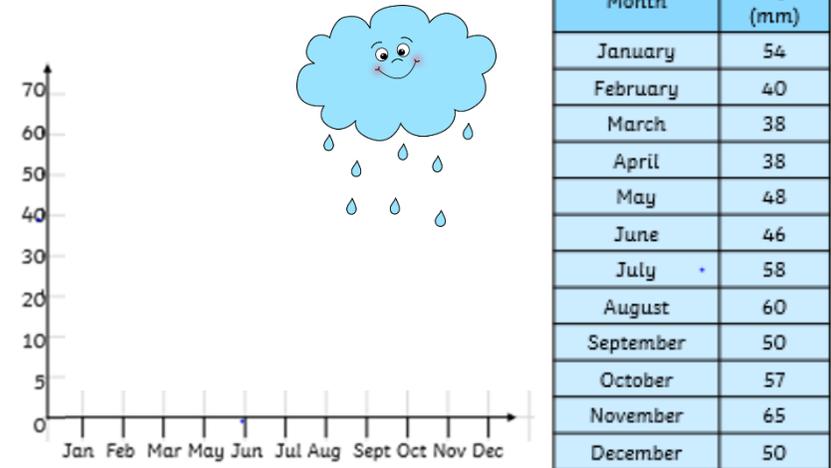
Children use their knowledge of scales and coordinates to represent data as a line graph. Drawing line graphs is a Year 5 Science objective and has been included here to support this learning and link to reading and interpreting graphs. Children draw axis with different scales depending on the data they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

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



- 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

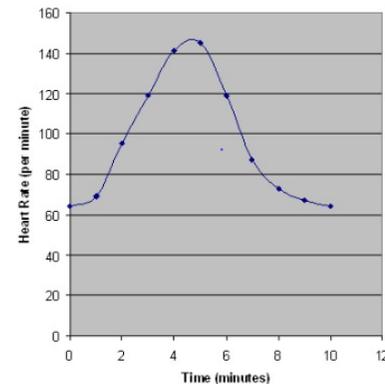
Reasoning and Problem Solving

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.

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?

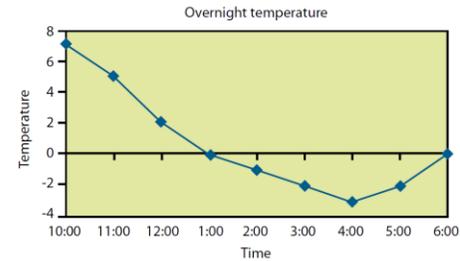
Is it clear?

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.

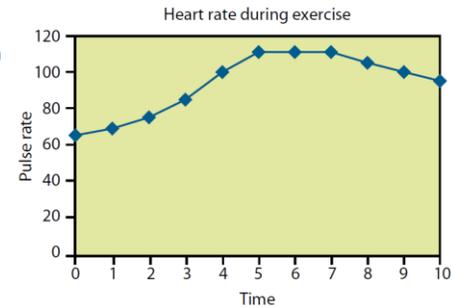


What was the highest/lowest temperature? What time did they occur?

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.

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

I won the 100m race because I have the biggest number.

Is Laura correct?

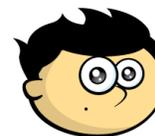
Explain your answer.

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

One stadium rounds to 76,000 when rounding to the nearest 1,000

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.

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.

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 | Break time (10.45 - 11.05) | French | Science | Design Technology |
| Wednesday | Literacy | DT | Art | Drama | ICT | Science |
| Thursday | PE | Maths | RE | English | History | PSCHE |
| Friday | Literacy | Maths | Art | Science | PE | |

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)