Planning Overview
Year 4 Statistics

Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Numerical data can be discrete or continuous. Discrete data are counted and have fixed values, for example the number of children who chose red as their favourite colour (this has to be a whole number and cannot be anything in between). Continuous data are measured, for example the time each child took to finish the race. (Theoretically this could be any time: 67·3 seconds, 67·33 seconds or 67·333 seconds, depending on the degree of accuracy that is applied). Continuous data are best represented with a line graph where every point on the line has a potential value.

<table>
<tr><th>Objective</th><th>Teaching and Learning</th></tr>
<tr><td>Draw and interpret pictograms</td><td>
Pictogram
Look at the pictogram below. Can children confidently read the data displayed on the pictogram?

<table>
<tr><td colspan="2">Number of Mobile Phones Sold</td></tr>
<tr><td>Monday</td><td>  </td></tr>
<tr><td>Tuesday</td><td>  </td></tr>
<tr><td>Wednesday</td><td>  </td></tr>
<tr><td>Thursday</td><td>  </td></tr>
<tr><td>Friday</td><td>  </td></tr>
<tr><td>Saturday</td><td>  </td></tr>
<tr><td>Sunday</td><td>  </td></tr>
</table>

100 phones = 

Ask children how the data would change if now one mobile phone symbol was worth 500 sales.

Children answer comparison and sum questions around the data shown in the above pictogram.

Children to make inferences about the data – why do you think there were more phones sold on a Saturday and Sunday?
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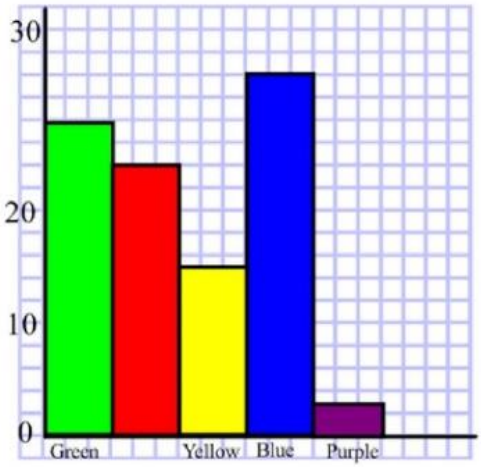
</table>

	Ask children to create a pictogram to show the number of children in each class in the school. How will they collect this information? How will they initially display this information (can children see that this would need to be in a frequency table and not a tally chart)? What image will children choose to use to display this data? What scale will children use to accurately show the data?
Draw and interpret bar charts	**Bar Chart** Make a class chart using cubes. Allow all children to vote by selecting a colour cube that matches their choice and then make a bar chart. Show how to draw on a bar chart / tally chart. Discuss how to read each axis. Link reading the axis to reading a number line. Encourage children to spot mistakes in types of graphs/charts **What is wrong with this bar chart?**  *TES 'A Lesson on how to draw and interpret bar charts'* Give the children 5 different types of data with some containing the same data in different formats e.g. Tally and bar chart. Can they match them up? Is there a piece of data that doesn't match another?
Answer questions from a range of different graphs	Allow children time to investigate and interpret discrete data in charts and tables – bar charts, pictograms, tally charts. Children to answer interpretation questions (e.g. In which months was the temperature below 10˚C? Which day had the most sales? How much sport was played on Sunday? How much sport was played over the weekend? Which day sold 3 ice creams? What is the difference in the amount of school meals made on Monday and Friday?) Make a link to other topic areas if possible so that children can use and apply their statistics skills.

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First4Maths Digging Deeper

EXPLORE

Give children the chance to collect data for the long jump. All children will have the same run up and have the chance to jump twice and record their best distance. Collect the data in a tally and represent it in a bar chart.

Suggested tally chart

Distance	Tally	Total
0cm – 50cm		
51cm – 100cm		
101cm – 150cm		
151cm – 200cm		
201cm – 250cm		
251cm – 300cm		
301cm – 350cm		

Can children answer mastery level questions about the data e.g. which was the most common distance? Which was the least common and why?

Can children collect data for another sport and choose how to present it?

</td></tr>
<tr><td>Solve comparison, sum and difference problems using information presented in charts</td><td>

Recap strategies from the addition and subtraction unit for totalling two or more amounts or finding the difference.

Apply these strategies to questions around data.

How many children played sports on Monday and Tuesday?

How many more children played sports on Friday than Monday?

How many children played sports on a weekday? What is the difference between the number of children playing sports during the week and the weekend?

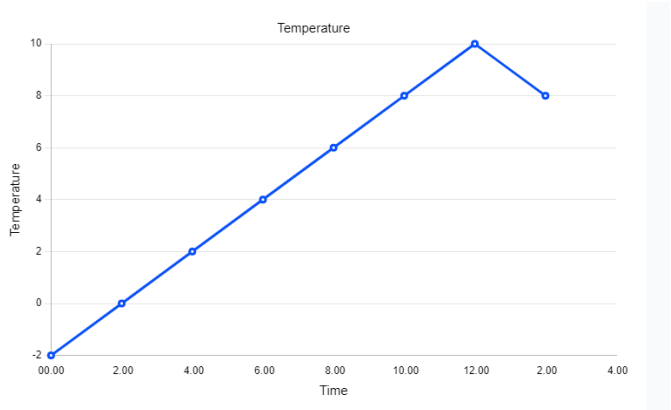
Children to answer questions where they infer about the data.
Why might more children have a school dinner on a Friday?
Why might more sport be played on a Friday?

</td></tr>
<tr><td>Interpret and present continuous data using line graphs.

Answer questions about a range of different graphs</td><td>

Line Graph

Teach children to read a chart representing continuous data – for example the temperature in the playground throughout the school day in February.



Created in 'linegraphmaker.co.uk'

</td></tr>
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<table>
<tr><td></td><td>What do the two axes represent now? The time of the day and the temperature in the playground. Teach the children to read the data from both axes through questioning.

What temperature was it at 9am?
What time was the temperature 8 degrees?
What time was the temperature 4 degrees?

Allow the children to look at the graph as a whole and to look at the overall trend in results. What do they notice?

What might the graph look like in January? At night? On a cloudy day?

What might happen to the graph if it went cloudy halfway through the day?

Why is a line graph a better way to graph this data than a bar chart?</td></tr>
<tr><td>Interpret and present continuous data using appropriate graphical methods

Understands which is the best method of recording data

Use an appropriate scale when representing data

Answer questions about a range of different graphs</td><td>Children to create their own line graph using data that they have collected (link to science if appropriate).

Can children choose and use an appropriate scale for this graph?

Can they create some statements, conclusions or questions that they could ask their partner about their graph?

Mastery
Check that children can answer questions about data presented in different ways:
■ Are they able to make connections when looking at the same data presented differently?
■ Can they answer questions about the data using inference and deduction or only direct retrieval?
■ Are they able to present data in different ways?
■ Do they label axes correctly?
■ Do they understand the scale and do they use an appropriate scale when presenting data?

Mastery with Greater Depth
Children hypothesise beyond the data that are presented, asking and answering questions such as 'What would happen if..?'

Can children create True or False statements about their own graph e.g. My sunflower grew the most in July, true or false?</td></tr>
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<td>Understands which is the best method of recording data

Use an appropriate scale when representing data</td>
<td>Children to be presented with a collection of data.

Children to choose an appropriate way for this data to be represented. Children to also choose an appropriate scale for their graph or chart. Children need to be able to explain and justify why they chose to present the data in the way that they did and reflect on whether this was the most appropriate way.

Mastery
Here is a table of the average temperature for each month of last year:
<table>
<tr><td>Month</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr>
<tr><td>Average Temp (°C)</td><td>6</td><td>7</td><td>10</td><td>12</td><td>16</td><td>18</td><td>21</td><td>22</td><td>18</td><td>14</td><td>10</td><td>7</td></tr>
</table>
Answer the questions below and explain your reasoning:
■ On average what was the hottest month of the year?
■ In which months was the average temperature below 10°C?
■ In which months would you choose to go outside without your coat on?

Choose another way to represent the data.

Mastery with Greater Depth
Here is a table of the average temperature for each month of last year:
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<tr><td>Month</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr>
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</table>
Write the word 'true', 'false' or 'unknown' next to each statement, giving an explanation for each response.
■ I would need to wear my coat outside in January.
■ The hottest day of the year was in August.
■ A temperature of –2 was recorded in January.

Choose two other ways to represent the data.</td>
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<td>Substantial Problems</td>
<td>NRICH – Now and then

Now and Then
Age 7 to 11 ★★
In 1908 the Olympic Games were held in London, that's just over 100 years ago. Then, just after World War 2 they were again in London in 1948.
Here are the results from some track events;
<table>
<tr><th>1908</th><th>1948</th></tr>
<tr><td>100 metres 10.8 secs</td><td>100 metres 10.3 secs</td></tr>
<tr><td>200 metres 22.6 secs</td><td>200 metres 21.1 secs</td></tr>
<tr><td>400 metres 50.0 secs</td><td>400 metres 46.2 secs</td></tr>
<tr><td>800 metres 112 secs</td><td>800 metres 109 secs</td></tr>
<tr><td>1500 metres 240 secs</td><td>1500 metres 229 secs</td></tr>
</table>
The 2012 London Olympics were another 64 years later.
How did the results differ?
Could you have predicted the results?
Perhaps more importantly, what's the reason for your answer?

What about the results for 2016, what would you predict?</td>
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