Unit Overview and Guidance

- The exemplification has been taken from the NCETM online 'Resource Toolkit', with additions in order to ensure full coverage.
- Links to the White Rose Maths hubs schemes of work (with questions categorised into the three aims of the national curriculum i.e. fluency, problem solving and reasoning) are hyperlinked to each of the objectives. Many thanks go to the White Rose Maths hub for permission to include their resources.
- The NCETM reasoning questions have also been incorporated into each unit and are identified in pale purple boxes underneath the group of the most relevant objectives.
- The 'big Ideas' sections from the NCETM 'Teaching for Mastery' documents have been included at the start of each unit. Hyperlinks to the full NCETM 'Teaching for Mastery' documents have also been included for easy reference.
- Hyperlinks to NRich activities have also been added to this version. These are found by clicking on the blue buttons like this one [1] at the bottom of relevant objective.
- Some additional content has been added in order to support mixed-aged planning. Any additional content is in *italics*. Occasionally ~~strikethrough~~ has been used to identify when an objective has been altered and this is primarily where an objective has been split between two units.
- Each unit is sub-divided into sections for ease of planning. Sub-categories in this unit are;
  1. Presenting and interpreting data
  2. Solving problems

	Yr 3	Yr 4	Yr 5	Yr 6
NCETM Teaching for Mastery Questions, tasks and activities to support assessment	**The Big Ideas** Data needs to be collected with a question or purpose in mind. Tally charts are used to collect data over time (cars passing the school, birds on the bird table). They can also be used to keep track of counting.	**The Big Ideas** In mathematics the focus is on numerical data. These 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 at what time did each child 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.	**The Big Ideas** Different representations highlight different aspects of data. It is important to be able to answer questions about data using inference and deduction, not just direct retrieval.	**The Big Ideas** Pie charts visually display relative proportions, for example, that the proportion of pupils at School A liking reading is greater than the proportion at School B.
	[Teaching for Mastery Year 3](#)	[Teaching for Mastery Year 4](#)	[Teaching for Mastery Year 5](#)	[Teaching for Mastery Year 6](#)

North Yorkshire County Council

MathsHUBS Archimedes NE

STATISTICS (STC - 3 weeks)

Strand	Yr3	Yr4	Yr5	Yr6
Presenting and Interpreting data	**interpret and present data using bar charts, pictograms and tables** **Pictograms** **Bar charts** **Tables** Process, present and interpret data to pose and answer questions. They use all representations such as Venn and Carroll diagrams, bar charts, pictograms. They collect data quickly onto a class tally chart. Children recognise that a tally involves grouping in fives and that this helps them to count the frequencies quickly and accurately. They produce a simple pictogram and/or bar chart, where a symbol represents 2 units. Children sort and classify objects, numbers or shapes according to two criteria, and display this work on Venn and Carroll diagrams Can you put the all numbers in the correct places? 25 247 7002 49 990 Class 3 collected litter in the park – How many of each item did they collect? How many more bags did they get than cans? 1 2 3 4 5 6 7 8 9 X	**interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs** **Interpret charts** **Introducing line graphs** **Line graphs** • Collect data, measuring where necessary. They work with a range of data, such as shoe size and width of shoe across the widest part of the foot, the number of letters in children's names, the width of their hand spans, the distance around their neck and wrist, data from nutrition panels on cereal packets, and so on. • They decide on a suitable question or hypothesis to explore for each data set they work on. For example, 'We think that…boys have larger shoes than girls', '…our neck measurements are twice as long as our wrist measurements', '…girls' names have more letters than boys' names' or '…children in our class would prefer to come to school by car but they usually have to walk'. • Children consider what data to collect and how to collect it. They collect their data and organise it in a table. They choose a Venn or Carroll diagram, or a horizontal or vertical pictogram or bar chart to represent the data. Where appropriate, they use the support of an ICT package. They justify their choice within the group so that they can present it. • They understand that they can join the tops of the bars on the bar-line chart to create a line graph because all the points along the line have meaning.	**complete, read and interpret information in tables, ~~including timetables~~** **Read and interpret tables** **Two way tables** I can find the information in a table or graph to answer a question The table shows the cost of coach tickets to different cities. What is the total cost for a return journey to York for one adult and two children?	**interpret and construct pie charts and line graphs and use these to solve problems** **Read and interpret line graphs** **Draw line graphs** **Use line graphs to solve problems** **Read and interpret pie charts** **Pie charts with percentages** **Draw pie charts** Class 6 did a survey of the number of trees in a country park. This pie chart shows their results. Estimate the fraction of trees in the survey that are oak trees. The children counted 60 ash trees. Use the pie chart to estimate the number of beech trees they counted. Children should be able to interpret and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should be able to interpret a graph connecting kilometres and miles This graph shows the number of people living in a town. How many people lived in the town in 1985? In which year was the number of people the same as in 1950? Find the year when the number of people first went below 20 000. 1

Solving Problems

Solving Problems

---

solve one-step and two-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts and pictograms and tables

Collect, represent and interpret data in order to answer a question that is relevant to them, for example:

- What new addition to the school play equipment would you like?
- Which class race shall we choose for sports day?

They decide on the information they need to collect and collect it efficiently. They collate the information on a tally chart or frequency table, then use this to make simple frequency diagrams such as bar charts, using ICT where appropriate. They discuss the outcomes, responding to questions such as:

- Which items had fewer than five votes?
- Would the table be the same if we asked Year 6?
- How might the table change if everyone had two votes?

Children present their conclusions to others, identifying key points that should be included. They make suggestions as to how this data could be used; for example, they may decide that they need to investigate the price of different equipment or discuss what they need to do to prepare for their chosen race.

1

---

solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Comparison, sum and difference

Undertake one or more of three enquiries:

- What vehicles are very likely to pass the school gate between 10:00 am and 11:00 am? Why? What vehicles would definitely not pass by? Why not? What vehicles would be possible but not very likely? Why? What if it were a different time of day? What if the weather were different?
- Does practice improve estimation skills? Children estimate the lengths of five given lines and record the estimate, measured length and difference. They repeat the activity with five more lines to see whether their estimation skills have improved after feedback.
- What would children in our class most like to change in the school? Children carry out a survey after preliminary research to whittle down the number of options to a sensible number, e.g. no more than five.
- Children identify a hypothesis and decide what data to collect to investigate their hypothesis. They collect the data they need and decide on a suitable representation. In groups, they consider different possibilities for their representation and explain why they have made their choice.
- In the first enquiry, children use tallies and bar charts. In the second, they use tables and bar charts to compare the two sets of measurements. In the third, they use a range of tables and charts to show their results, including Venn and Carroll diagrams. They use ICT where appropriate.

1 **2** **3**

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

Read and interpret line graphs

Draw line graphs

Problems with line graphs

Begin to decide which representations of data are most appropriate and why.

Connect work on co-ordinates and scales to interpret time graphs.

This graph shows how far Alfie and Chen walked one afternoon. They set off at 1.45pm and stopped twice.
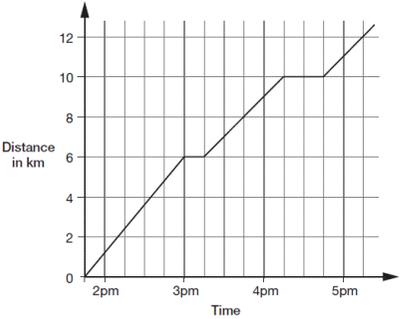
How many Km did they walk between the two breaks? What time did they start their second break?

This graph shows cost of phone calls during the day and evening.
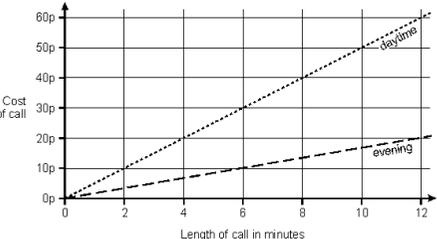
How much does it cost to make a 9-minute call in the daytime? How much **more** does it cost to make a 6-minute call during the day than in the evening?

---

calculate and interpret the mean as an average

The mean

From a simple database, children should be able to find the most common score (mode) as well as the mean score for each test.

Children should be able to choose their own sets of data to match given criteria, e.g. find a set of five numbers that have a mean of 5 and a range of 7.

Here is a bar chart showing rainfall
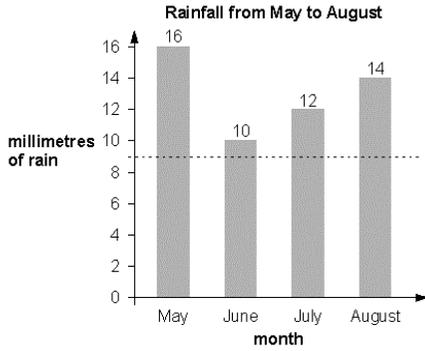
Kim draws a dotted line on the bar chart. She says '*The dotted line on the chart shows the mean rainfall for the four months*'

Use the chart to explain why Kim **cannot** be correct

Here are five number cards. Write the missing number so that the **mean** is **2**.

1

STATISTICS (STC - 3 weeks)

Solving Problems	NCETM Reasoning	**True or false?** (Looking at a bar chart) "Twice as many people like strawberry than lime". Is this true or false? **Convince me.** Make up your own 'true/false' statement about the bar chart. **What's the same, what's different?** Pupils identify similarities and differences between different representations and explain them to each other **Create a question** Pupils ask (and answer) questions about different statistical representations using key vocabulary relevant to the objectives.	**True or false?** (Looking at a graph showing how the class sunflower is growing over time) "Our sunflower grew the fastest in July". Is this true or false? **Convince me.** Make up your own 'true/false' statement about the graph. **What's the same, what's different?** Pupils identify similarities and differences between different representations and explain them to each other **Create a question** Pupils ask (and answer) questions about different statistical representations using key vocabulary relevant to the objectives.	**True or false?** (Looking at a train time table) "If I want to get to Exeter by 4 o'clock this afternoon, I will need to get to Taunton station before midday". Is this true or false? **Convince me.** Make up your own 'true/false' statement about a journey using the timetable. **What's the same, what's different?** Pupils identify similarities and differences between different representations and explain them to each other **Create a question** Pupils ask (and answer) questions about different statistical representations using key vocabulary relevant to the objectives.	**True or false?** (Looking at a pie chart) "More than twice the number of people say their favourite type of T.V. programme is soaps than any other" Is this true or false? **Convince me.** Make up your own 'true/false' statement about the pie chart. **What's the same, what's different?** Pupils identify similarities and differences between different representations and explain them to each other **Create a question** Make up a set of five numbers with a mean of 2.7 **Missing information** The mean score in six test papers in a spelling test of 20 questions is 15. Five of the scores were 13 12 17 18 16 What was the missing score?

North Yorkshire County Council

MathsHUBS Archimedes NE