

Penbridge School Computing Curriculum



Unit: Data Collection

NC Link:

(KS1) Use technology purposefully to create, organise, store, manipulate, and retrieve digital content

(KS2) *Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.*

What is data?

Data is just information. Presenting it could be in the form of tables, charts or graphs; it may be figures in a spreadsheet or records in a database; or it may be in the form of text, images, video or audio. We collect data by gathering from different sources.

To analyse and evaluate is to study or examine the data and draw our own conclusions. You may collect data from one source and insert it into another (e.g. creating a graph in a spreadsheet and copying it into a presentation).

Success Criteria Progression:

Year 1	Children will be able to count and describe small groups of objects. Children will be able to compare groups of objects. Children will be able to answer questions about groups of objects.
Year 2	Children will be able to record data in a tally chart. Children will be able to represent objects as a picture. Children will be able to create a pictogram. Children will be able to group and describe objects based on attributes.
Year 3	Children can explain what data is and describe ways to collect it. Children will be able to create pictograms to represent data. Children will be able to create bar charts to represent data. Children will be able to create branching databases.
Year 4	Children can explain what a database is. Children will be able to use databases to answer questions. Children will be able to compare databases visually. Children will be able to use real life databases.
Year 5	Children will be able to input data into a spreadsheet and export the data in a variety of ways: charts, bar charts, pie charts. Children will be able to use simple formulae to solve calculations including =sum and other statistical functions. Children will be able to explain what anomalies in data are and explain why some data might not be accurate.
Year 6	Children will begin to be able to recognise trends and relationships from data. Children will be able to explain what binary is and why computers use binary. Children will be able to explain how binary is used to represent data, through converting binary (and vice versa).

Year 1

Follow NCCE (Teach Computing): Data and information – Grouping data					
Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6
<p><u>LO: To label objects.</u></p> <p>Learners will begin to understand that objects have many different labels that can be used to put them into groups. They will name different objects and begin to experiment with placing them into different groups. Learners will also label a group of objects, and begin to understand that an object can fit into more than one group depending on the context.</p>	<p><u>LO: To identify that objects can be counted.</u></p> <p>Learners will begin to think about grouping objects based on what the objects are. They will demonstrate the ability to count a small number of objects before they group them, and will then begin to show that they can count groups of objects with the same label. Learners will also begin to learn that computers are not intelligent, and require input from humans to perform tasks.</p>	<p><u>LO: To describe objects in different ways.</u></p> <p>Learners will begin to understand that objects can be described in many different ways. They will identify the properties of objects and begin to understand that properties can be used to group objects; for example, objects can be grouped by colour or size. Finally, learners will demonstrate their ability to find objects with similar properties and begin to understand the reason that we need to give labels to images on a computer.</p>	<p><u>LO: To count objects with the same properties.</u></p> <p>Learners will classify objects based on their properties. They will group objects that have similar properties, and will be able to explain how they have grouped these. Learners will begin to group a number of the same objects in different ways, and will demonstrate their ability to count these different groups.</p>	<p><u>LO: To compare groups of objects.</u></p> <p>Learners will choose how they want to group different objects by properties. They will begin to compare and describe groups of objects, then they will record the number of objects in each group.</p>	<p><u>LO: To answer questions about groups of objects.</u></p> <p>Learners will decide how to group objects to answer questions. They will compare their groups by thinking about how they are similar or different, and they will record what they find. They will then share what they have found with their peers.</p>

Full lesson plans and resources available on <https://teachcomputing.org/curriculum/key-stage-1/data-and-information-grouping-data>

Year 2

Follow NCCE (Teach Computing): Data and information - Pictograms					
Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6
<p><u>LO: To recognise that we can count and compare objects using tally charts.</u></p> <p>During this lesson learners will begin to understand the importance of organising data effectively for counting and comparing. They will create their own tally charts to organise data, and represent the tally count as a total. Finally, they will answer questions comparing totals in tally charts using vocabulary such as ‘more than’ and ‘less than’.</p>	<p><u>LO: To recognise that objects can be represented as pictures.</u></p> <p>During this lesson learners will become familiar with the term ‘pictogram’. They will create pictograms manually and then progress to creating them using a computer. Learners will begin to understand the advantages of using computers rather than manual methods to create pictograms, and use this to answer simple questions.</p>	<p><u>LO: To create a pictogram.</u></p> <p>During this lesson learners will think about the importance of effective data collection and will consider the benefits of different data collection methods: why, for example, we would use a pictogram to display the data collected. They will collect data to create a tally chart and use this to make a pictogram on a computer. Learners will explain what their finished pictogram shows by writing a range of statements to describe this.</p>	<p><u>LO: To select objects by attribute and make comparisons.</u></p> <p>During this lesson learners will think about ways in which objects can be grouped by attribute. They will then tally objects using a common attribute and present the data in the form of a pictogram. Learners will answer questions based on their pictograms using mathematical vocabulary such as ‘more than’/‘less than’ and ‘most’/‘least’.</p>	<p><u>LO: To recognise that people can be described by attributes.</u></p> <p>During this lesson learners will understand that people can be described by attributes. They will practise using attributes to describe images of people and the other learners in the class. The learners will collect data needed to organise people using attributes and create a pictogram to show this pictorially. Finally, learners will draw conclusions from their pictograms and share their findings.</p>	<p><u>LO: To explain that we can present information using a computer.</u></p> <p>During this lesson learners will understand that there are other ways to present data than using tally charts and pictograms. They will use a pre-made tally chart to create a block diagram on their device. Learners will then share their data with a partner and discuss their findings. They will consider whether it is always OK to share data and when it is not OK. They will know that it is alright to say no if someone asks for their data, and how to report their concerns.</p>

Full lesson plans and resources available on <https://teachcomputing.org/curriculum/key-stage-1/data-and-information-pictograms>

Year 3

Lesson 1	Lesson 2	Lesson 3	Lesson 4
<p><u>LO: To explain what data is and how we can collect and record it.</u></p> <p><u>Starter:</u> Complete before self-assessment for all units.</p> <p><u>Input:</u> Class discussion: What is Data? How do you think people collect data? What could we collect data about? How could we record our data? Model using tally charts or numbers in a table to collect data.</p> <p><u>Activity:</u> Circle map - What is data? FOR: How can we collect data? Then, children create their own question and collect the data. Children must choose their own way to collect and record the data.</p> <p><u>Less Able:</u> Give table drawn for them. Come up with question in a group.</p> <p><u>Most Able:</u> Blue hat – Why do you think collecting data is important? Do you think using a tally or numbers is more effective for recording data? Why?</p> <p><u>Plenary:</u> Which method for collection of data do you think is the most effective? Why?</p>	<p><u>LO: To use pictograms to represent data.</u></p> <p><u>Starter:</u> What do you already know about pictograms?</p> <p><u>Input:</u> Show pictograms - What can we learn from them? How do they represent the data? Answer questions about pictograms. Model turning data into a pictogram. https://www.j2e.com/jit5#pictogram (Could use data collected during input in the last lesson)</p> <p><u>Activity:</u> Children to turn their data from last lesson into a pictogram on the website. Print screen and paste onto OneNote. https://www.j2e.com/jit5#pictogram</p> <p><u>EXT:</u> Write three questions for a partner to answer about your pictogram.</p> <p><u>Less Able:</u> Create one pictogram as a group and teacher to distribute picture of pictogram.</p> <p><u>Most Able:</u> Draw pictograms by hand and design them so they must include half shapes. <i>Teacher to add a photo to their one note if laptop cameras aren't working.</i></p> <p><u>Plenary:</u> Use thinking hats to analyse using pictograms to represent data.</p>	<p><u>LO: To use bar charts to represent data.</u></p> <p><u>Starter:</u> What do you already know about bar charts?</p> <p><u>Input:</u> Show bar charts - What can we learn from them? How do they represent the data? Answer questions about bar charts. Model turning data into a bar chart. https://www.j2e.com/jit5#chart (Could use data collected during input in the first lesson)</p> <p><u>Activity:</u> Children to turn their data from last lesson into a bar chart on the website. Print screen and paste onto OneNote.</p> <p><u>EXT:</u> Write three questions for a partner to answer about your pictogram.</p> <p><u>Less Able:</u> Create one bar chart as a group and teacher to distribute picture of bar chart.</p> <p><u>Most Able:</u> Draw bar chart by hand. <i>Teacher to add a photo to their one note if laptop cameras aren't working.</i></p> <p><u>Plenary:</u> Use thinking hats to analyse using bar charts to represent data.</p>	<p><u>LO: To use branching databases.</u></p> <p><u>Starter:</u> Prediction Key – what is a branching database?</p> <p><u>Input:</u> Introduce branching databases. Go to: nccce.io/minibtrees Answer the questions to identify the following minibeasts (click on play to start). Create a sorting database using pictures on the flipchart as a class.</p> <p><u>Activity:</u> Children to create their own sorting database https://www.j2e.com/jit5#branch Print screen and paste onto OneNote.</p> <p><u>Less Able:</u> Create one as a group – support with creating questions.</p> <p><u>More Able:</u> Create branching diagram and then analyse your question choices. Blue hat: Have you chosen an effective question? Could there have been a more effective question?</p> <p><u>Plenary:</u> Swap with a partner. Choose one of the objects and answer the questions to test the branching database</p>
Laptops (OneNote)	Laptops (OneNote + website)	Laptops (OneNote + website)	Laptops (OneNote + website)

Year 4

Follow NCCE (Teach Computing) Flat-file Database Planning					
Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6
<p><u>LO: To use a form to record information.</u></p> <p>Children will learn about databases and then create their own.</p> <p>Note: The cards students create in Activity 1 will be needed again in Lesson 3</p>	<p><u>LO: To compare paper and computer-based databases.</u></p> <p>Children will look at computer-based databases and then evaluate them.</p>	<p><u>LO: To group and sort data to answer questions.</u></p> <p>Children will learn why we use databases and learn how to group the data in a database.</p>	<p><u>LO: To explain that tools can be used to select specific data.</u></p> <p>Children will learn about using 'AND' + 'OR' to find specific data.</p>	<p><u>LO: To explain that computer programs can be used to compare data visually.</u></p> <p>Children will create different charts to represent data.</p>	<p><u>LO: To use a real-world database to answer questions.</u></p> <p>Children will look at flight databases to answer questions about the cheapest/ quickest etc flight .</p>

Full lesson plans and resources available on <https://teachcomputing.org/curriculum/key-stage-2/data-and-information-flat-file-databases>

Year 5

Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5															
<p><u>LO: To explain what excel is used for.</u> <u>Starter:</u> What is data? Why might we collect data? What data could we collect?</p> <p><u>Input:</u> Introduce Excel to children – discuss cells, rows and columns. Give children 5 minutes to just explore Excel and try to remember what they have previously learnt on Excel.</p> <p><u>Activity:</u> Children collect data from the class and put into a table.</p> <p><u>Most Able:</u> Format the cells in different ways</p> <p><u>Plenary:</u> Prediction key – how do you think we can use Excel to solve mathematical calculations?</p>	<p><u>LO: To create charts from data.</u> <u>Starter:</u> What did we learn about using excel last week? Open your spreadsheet.</p> <p><u>Input:</u> Model how to turn data into different charts. Practise with children step by step</p> <p><u>Activity:</u> Children to turn their data from last week into different charts.</p> <p><u>More Able:</u> Blue hat - analyse the effectiveness of each of the charts.</p> <p><u>Plenary:</u> Write a steps to success for turning data into charts on excel. Blue hat – Which chart type do you think is the easiest to read? Why?</p>	<p><u>LO: To read data and recognise anomalies.</u> <u>Starter:</u> What can you remember about Excel?</p> <p><u>Input:</u> When do you think data is collected in real life? Watch video. https://www.bbc.co.uk/teach/class-clips-video/computing-ks2-working-with-data/zp84g7h</p> <p><u>Activity:</u></p> <ol style="list-style-type: none"> How can we read data from charts? Children to have a go on their spreadsheet What are anomalies? Children to have a go at recognising anomalies on their spreadsheet. <p><u>Most Able:</u> Create a glossary as we go.</p> <p><u>Plenary:</u> One child to come to the front – give them a word which links to Excel spreadsheets. Children have to describe it to the class without using the word whilst the other children guess what they're describing.</p>	<p><u>LO: To use simple formulae to solve calculations.</u> <u>Starter:</u> What have we already learnt about excel?</p> <p><u>Input:</u> Re-cap basic excel information already learnt. Explain that excel can be used to solve maths calculations. Model to children how to use the formulae</p> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Sum</th> <th>Symbol Used in a Spreadsheet</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>Adding</td> <td style="text-align: center;">+</td> <td>= A1 + B2</td> </tr> <tr> <td>Subtracting</td> <td style="text-align: center;">-</td> <td>= A1 - B2</td> </tr> <tr> <td>Multiplying</td> <td style="text-align: center;">* (star)</td> <td>= A1 * B2</td> </tr> <tr> <td>Dividing</td> <td style="text-align: center;">/</td> <td>= A1 / B2</td> </tr> </tbody> </table> <p>Then show children how to use the SUM function and select multiple cells.</p> <p><u>Activity:</u> Children to answer questions using the formulae</p> <p><u>Most Able:</u> Input own data to write questions for</p> <p><u>Plenary:</u> Prediction key: If SUM means to add the values in the cells, what do you think MIN and MAX mean?</p>	Sum	Symbol Used in a Spreadsheet	Example	Adding	+	= A1 + B2	Subtracting	-	= A1 - B2	Multiplying	* (star)	= A1 * B2	Dividing	/	= A1 / B2	<p><u>LO: To use simple formulae to solve calculations.</u> <u>Starter:</u> What have we already learnt about excel? Can you remember how to do the four operations on excel?</p> <p><u>Input:</u> Re-cap what SUM means and how it can be used. Why would this be useful? Prediction key – show children other statistical functions, can they predict what they are used for?</p> <p>Model to children the formulas: SUM – adds values in selected cells MIN – finds smallest value MAX – finds largest value AVERAGE – finds the average value COUNT – counts how many of the selected cells have numbers in them</p> <p>Like formulas, all functions start with an equals sign (=) followed by the function's name, eg SUM, MIN, MAX, etc.</p> <p><u>Activity:</u> Children to answer questions using the formulae</p> <p><u>Most Able:</u> Improve the design of your spreadsheet by adding a border around cells; changing the background 'fill' colour of cells; changing the font colour; changing the alignment of text (noting that text should be aligned to the left and numbers to the right).</p> <p><u>Plenary:</u> Create a circle map filled with everything you have learned about Excel.</p>
Sum	Symbol Used in a Spreadsheet	Example																	
Adding	+	= A1 + B2																	
Subtracting	-	= A1 - B2																	
Multiplying	* (star)	= A1 * B2																	
Dividing	/	= A1 / B2																	
Excel – Spreadsheets available on Teams																			

Year 6 – One lesson to be virtual trip to Bletchley Park

Lesson 1	Lesson 2	Lesson 3	Lesson 4
<p><u>LO: To recognise trends and correlations from data.</u></p> <p><u>Starter:</u> Excel retrieval</p> <p><u>Input:</u> What do you know about data? How do we read data?</p> <p><u>Activity:</u> What is a trend? <i>A trend is a pattern found in time series datasets; it is used to describe if the data is showing an upward or downward movement for part, or all of, the time series.</i> Practise reading trends as a class</p> <p>What is a correlation in data? <i>A correlation is a relationship or connection between two or more things. The word correlation is made of 'co', meaning together, and 'relation'. Put simply, a correlation is a mutual relationship between one or more things. In maths, it is often used to talk about the relationship between different sets of data.</i> Practise spotting correlations in data as a class</p> <p><u>Less Able/More Able:</u> Mixed ability pairings</p> <p><u>Plenary:</u> White hat - Write a definition for trend and correlation.</p>	<p><u>LO: To recognise trends and correlations from data.</u></p> <p><u>Starter:</u> Retrieval of anomaly learning from Year 5</p> <p><u>Input:</u> Re-cap learning from last lesson</p> <p><u>Activity:</u> Children to independently read trends and spot correlations/anomalies.</p> <p><u>Less Able:</u> Work in a guided group</p> <p><u>More Able:</u> Think of own examples which will show different trends or correlations and draw a graph to represent it.</p> <p><u>Plenary:</u> Check your partner's responses. Do you agree with them? Could a different answer be accurate?</p>	<p><u>LO: To explain why computers use binary.</u></p> <p><u>Starter:</u> Prediction Key – what is binary?</p> <p><u>Input:</u> Introduce binary – go through slides explaining why computers use coding.</p> <p><u>Activity:</u> Binary True or False activity (on Teams) <u>CH:</u> Codebreaker</p> <p><u>Less Able:</u> Turn statements into strips for children to physically sort and discuss</p> <p><u>Plenary:</u> Give yourself a score out of 5 for how well you understand binary. Write three questions you still have about binary coding?</p> <p><i>Look at these questions to prepare answers before next lesson.</i></p>	<p><u>LO: To explain how binary represents data.</u></p> <p><u>Starter:</u> Q&A about binary using children's questions from yesterday.</p> <p><u>Input:</u> Look at how binary works in more detail. Children may need a lot of support with this.</p> <p><u>Activity:</u> Convert binary codes into numbers</p> <p><u>Less Able:</u> Simplified codebreaker activity</p> <p><u>More Able:</u> Convert numbers to binary codes.</p> <p><u>Plenary:</u> Write your top 5 facts about binary</p>