

Lesson 6	Study Module 4: Working with structured data (1/3)	Time
Lesson objectives	In this lesson students are learning how to: <ul style="list-style-type: none"> <li>• structure and present data in a table</li> </ul>	
Learning outcomes	At the end of the lesson students will be able to: <ul style="list-style-type: none"> <li>• build a data table</li> <li>• enter meaningful field names</li> <li>• work with different types of data</li> <li>• format data</li> <li>• sort data in different ways</li> </ul>	
Specification coverage	L1: 2.1, 5.1, 7.1, 8.3, 8.4 L2: 2.1, 4.1, 6.1, 7.3, 7.4	
Resources	<b>Starter</b>	5 mins
Study Module 4	Call the register. When you have finished, ask students to suggest three other ways of ordering everyone in the group. Ensure one is based numbers e.g. date of birth, UPN - unique pupil number on text.	
SAM Mark Scheme		
Key vocabulary	Ask them to come up with combinations of criteria, such as all girls first, in age, name or UPN order, followed by boys in age name or UPN order.	
Table		
Column	<b>Share lesson objectives</b>	5 mins
Row	Introduce the lesson and share learning objective and outcomes.	
Record		
Field	<b>Tables to structure data</b>	15 mins
Header row	Take time to introduce key terms for structured data. Make sure students fully understand them at the end of the lesson.	
Heading		
Field name	Show students the webpage <a href="http://www.bankofengland.co.uk/banknotes/current/index.htm">http://www.bankofengland.co.uk/banknotes/current/index.htm</a> and scroll down so that the £5 note is at the top of the screen with other notes showing underneath.	
Unique identifier		
Sorting	Ask students to tell you obvious features that differentiate UK bank notes.	
Formatting		
Header / Footer	Leaving space on the left for one other, write some of their features on one line on the board in capital letters. Include the following to ensure a mixture of data types and formatting options.	

Lesson 6	Study Module 4: Working with structured data (1/3)	Time																																																																														
<p>Start with DENOMINATION (data type: number; format: currency); 1<sup>st</sup> ISSUED (data type: number; format: date); SIZE (data type: number; format: number - option to calculate to area in square mm); PORTRAITS (data type: text; format: standard); COLOUR (data type: text; format: matching font colour).</p> <table border="1" data-bbox="405 506 1241 636"> <thead> <tr> <th>ID</th> <th>DENOMINATION</th> <th>1st ISSUED</th> <th>SIZE</th> <th>PORTRAIT</th> <th>COLOUR</th> </tr> </thead> <tbody> <tr> <td></td> <td>£5</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>£10</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>£20</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>£50</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Ask students how many entries you can have under 'denomination'. Write £5, £10, £20 and £50 underneath denomination.</p> <p>Draw vertical and horizontal lines to highlight the structure of the display - do not use the word 'grid' but introduce the terms <b>table</b>, <b>rows</b> (one for the 'headings' in capital letters and one each for the four denominations, and <b>columns</b> (one for each feature).</p> <p>Point out that, where rows and columns intersect, they create <b>fields</b>. Each one has a name (<b>fieldname</b>) which it gets from the column heading it is under.</p> <p>With that information in place underneath DENOMINATIONS, ask students to tell you what to write, in small letters, under the other categories or call students out to fill in one row or column.</p> <table border="1" data-bbox="405 1223 1241 1346"> <thead> <tr> <th></th> <th>DENOMINATION</th> <th>1st ISSUED</th> <th>SIZE</th> <th>PORTRAIT</th> <th>COLOUR</th> <th></th> <th>Header row</th> </tr> </thead> <tbody> <tr> <td></td> <td>£5</td> <td>07-Jun-90</td> <td>135x70</td> <td>E Frey</td> <td>green</td> <td>record1</td> <td>row 2</td> </tr> <tr> <td></td> <td>£10</td> <td>29-Apr-92</td> <td>142x75</td> <td>Charles Darwin</td> <td>orange</td> <td>record2</td> <td>row 3</td> </tr> <tr> <td></td> <td>£20</td> <td>09-Jul-70</td> <td>149x80</td> <td>Adam Smith</td> <td>blue</td> <td>record3</td> <td>row 4</td> </tr> <tr> <td></td> <td>£50</td> <td>20-Mar-81</td> <td>156x85</td> <td>Sir J Houblon</td> <td>red</td> <td>record4</td> <td>row 5</td> </tr> <tr> <td></td> <td>£85</td> <td></td> <td>45280 square mm</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Explain that:</p> <ul style="list-style-type: none"> <li>• a record is a set of data that belongs together, arranged on the same row. In this case there are four records, one per denomination</li> <li>• there are different <b>types of data</b> which you can <b>format</b> to aid understanding</li> <li>• you can carry out <b>calculations</b> with numbers, e.g. totalling-up of DENOMINATION (£85) and SIZE (45280 mm).</li> </ul>			ID	DENOMINATION	1st ISSUED	SIZE	PORTRAIT	COLOUR		£5						£10						£20						£50						DENOMINATION	1st ISSUED	SIZE	PORTRAIT	COLOUR		Header row		£5	07-Jun-90	135x70	E Frey	green	record1	row 2		£10	29-Apr-92	142x75	Charles Darwin	orange	record2	row 3		£20	09-Jul-70	149x80	Adam Smith	blue	record3	row 4		£50	20-Mar-81	156x85	Sir J Houblon	red	record4	row 5		£85		45280 square mm				
ID	DENOMINATION	1st ISSUED	SIZE	PORTRAIT	COLOUR																																																																											
	£5																																																																															
	£10																																																																															
	£20																																																																															
	£50																																																																															
	DENOMINATION	1st ISSUED	SIZE	PORTRAIT	COLOUR		Header row																																																																									
	£5	07-Jun-90	135x70	E Frey	green	record1	row 2																																																																									
	£10	29-Apr-92	142x75	Charles Darwin	orange	record2	row 3																																																																									
	£20	09-Jul-70	149x80	Adam Smith	blue	record3	row 4																																																																									
	£50	20-Mar-81	156x85	Sir J Houblon	red	record4	row 5																																																																									
	£85		45280 square mm																																																																													

Lesson 6	Study Module 4: Working with structured data (1/3)	Time																																																																																	
	<p>Show students webpage  <a href="http://www.bankofengland.co.uk/banknotes/about/stats.htm">http://www.bankofengland.co.uk/banknotes/about/stats.htm</a>                      and zoom in on the table showing the stock of notes in circulation.</p> <p>Ask students whether or not it is possible to uniquely identify each of the thousands of notes in circulation or stock - and if so, how.</p> <p>The answer is yes: each bank note has a unique serial number. Extend the table to the left, add a new column and label it ID in the space on the left of the header line.</p> <table border="1" data-bbox="405 689 1240 869"> <thead> <tr> <th>ID</th> <th>DENOMINATION</th> <th>1st ISSUED</th> <th>SIZE</th> <th>PORTRAIT</th> <th>COLOUR</th> <th></th> <th>Header row</th> </tr> </thead> <tbody> <tr> <td></td> <td>£5</td> <td>07-Jun-90</td> <td>135x70</td> <td>E Frey</td> <td>green</td> <td>record1</td> <td>row 2</td> </tr> <tr> <td></td> <td>£10</td> <td>29-Apr-92</td> <td>142x75</td> <td>Charles Darwin</td> <td>orange</td> <td>record2</td> <td>row 3</td> </tr> <tr> <td></td> <td>£20</td> <td>09-Jul-70</td> <td>149x80</td> <td>Adam Smith</td> <td>blue</td> <td>record3</td> <td>row 4</td> </tr> <tr> <td></td> <td>£50</td> <td>20-Mar-81</td> <td>156x85</td> <td>Sir J Houblon</td> <td>red</td> <td>record4</td> <td>row 5</td> </tr> <tr> <td></td> <td>£85</td> <td></td> <td>45280 square mm</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Table column1</td> <td>Table column2</td> <td>Table column3</td> <td>Table column4</td> <td>Table column5</td> <td>Table column6</td> <td></td> <td></td> </tr> <tr> <td>Fieldname 1</td> <td>Fieldname 2</td> <td>Fieldname 3</td> <td>Fieldname 4</td> <td>Fieldname 5</td> <td>Fieldname 6</td> <td></td> <td></td> </tr> </tbody> </table> <p>Ask students by how many rows the table would grow if you included the serial numbers as a bank note's <b>unique identifier</b>. The answer is tens of thousands, too many to write manually on the board. Ask if they know a software application program that could handle that many records?</p> <p>Stress that a table gives data a structure, however small or large the data set, and that once data is in a table it is much easier to work with it.</p>	ID	DENOMINATION	1st ISSUED	SIZE	PORTRAIT	COLOUR		Header row		£5	07-Jun-90	135x70	E Frey	green	record1	row 2		£10	29-Apr-92	142x75	Charles Darwin	orange	record2	row 3		£20	09-Jul-70	149x80	Adam Smith	blue	record3	row 4		£50	20-Mar-81	156x85	Sir J Houblon	red	record4	row 5		£85		45280 square mm					Table column1	Table column2	Table column3	Table column4	Table column5	Table column6			Fieldname 1	Fieldname 2	Fieldname 3	Fieldname 4	Fieldname 5	Fieldname 6																				
ID	DENOMINATION	1st ISSUED	SIZE	PORTRAIT	COLOUR		Header row																																																																												
	£5	07-Jun-90	135x70	E Frey	green	record1	row 2																																																																												
	£10	29-Apr-92	142x75	Charles Darwin	orange	record2	row 3																																																																												
	£20	09-Jul-70	149x80	Adam Smith	blue	record3	row 4																																																																												
	£50	20-Mar-81	156x85	Sir J Houblon	red	record4	row 5																																																																												
	£85		45280 square mm																																																																																
Table column1	Table column2	Table column3	Table column4	Table column5	Table column6																																																																														
Fieldname 1	Fieldname 2	Fieldname 3	Fieldname 4	Fieldname 5	Fieldname 6																																																																														
	<p><b>Which application software should I use?</b></p> <p>Explain that both spreadsheets and database software can handle large amounts of structured data. State that they (the students) will use spreadsheets as they will handle single tables, not several tables at the same time (related tables).</p> <p><i>Note:</i></p> <p><i>You might want to point out that both spreadsheet-speak and table-speak use the terms header row and rows, columns, records - but the intersection of a row and column is called <b>field</b> in table-speak and <b>cell</b> in spreadsheet-speak.</i></p> <table border="1" data-bbox="405 1644 1240 1841"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> <th>G</th> <th>H</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>ID</td> <td>DENOMINATION</td> <td>1st ISSUED</td> <td>SIZE</td> <td>PORTRAIT</td> <td>COLOUR</td> <td></td> <td>Header row</td> </tr> <tr> <td>2</td> <td>ID field</td> <td>£5</td> <td>07-Jun-90</td> <td>135x70</td> <td>E Frey</td> <td>green</td> <td>record1</td> <td>row 2</td> </tr> <tr> <td>3</td> <td>ID field</td> <td>£10</td> <td>29-Apr-92</td> <td>142x75</td> <td>Charles Darwin</td> <td>orange</td> <td>record2</td> <td>row 3</td> </tr> <tr> <td>4</td> <td>cell A4</td> <td>£20</td> <td>09-Jul-70</td> <td>149x80</td> <td>Adam Smith</td> <td>blue</td> <td>record3</td> <td>row 4</td> </tr> <tr> <td>5</td> <td>cell A5</td> <td>£50</td> <td>20-Mar-81</td> <td>156x85</td> <td>Sir J Houblon</td> <td>red</td> <td>record4</td> <td>row 5</td> </tr> <tr> <td>6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>Table column1</td> <td>Table column2</td> <td>Table column3</td> <td>Table column4</td> <td>Table column5</td> <td>Table column6</td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>Fieldname 1</td> <td>Fieldname 2</td> <td>Fieldname 3</td> <td>Fieldname 4</td> <td>Fieldname 5</td> <td>Fieldname 6</td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	G	H	1	ID	DENOMINATION	1st ISSUED	SIZE	PORTRAIT	COLOUR		Header row	2	ID field	£5	07-Jun-90	135x70	E Frey	green	record1	row 2	3	ID field	£10	29-Apr-92	142x75	Charles Darwin	orange	record2	row 3	4	cell A4	£20	09-Jul-70	149x80	Adam Smith	blue	record3	row 4	5	cell A5	£50	20-Mar-81	156x85	Sir J Houblon	red	record4	row 5	6									7	Table column1	Table column2	Table column3	Table column4	Table column5	Table column6			8	Fieldname 1	Fieldname 2	Fieldname 3	Fieldname 4	Fieldname 5	Fieldname 6			5 mins
	A	B	C	D	E	F	G	H																																																																											
1	ID	DENOMINATION	1st ISSUED	SIZE	PORTRAIT	COLOUR		Header row																																																																											
2	ID field	£5	07-Jun-90	135x70	E Frey	green	record1	row 2																																																																											
3	ID field	£10	29-Apr-92	142x75	Charles Darwin	orange	record2	row 3																																																																											
4	cell A4	£20	09-Jul-70	149x80	Adam Smith	blue	record3	row 4																																																																											
5	cell A5	£50	20-Mar-81	156x85	Sir J Houblon	red	record4	row 5																																																																											
6																																																																																			
7	Table column1	Table column2	Table column3	Table column4	Table column5	Table column6																																																																													
8	Fieldname 1	Fieldname 2	Fieldname 3	Fieldname 4	Fieldname 5	Fieldname 6																																																																													

Lesson 6	Study Module 4: Working with structured data (1/3)	Time
	<p>Conclude by wiping off or deleting the table's header row and ask students whether or not the remaining words on the board make as much sense as before.</p> <p>Remind students of the importance of meaningful names for files and folders (Lesson 2). The same applies to fields.</p>	
	<p><b>Formatting data</b></p> <p>File and folder names cannot be formatted but field names can. Tell students that field names - like headlines in a newspaper or magazine - should stand out and not be truncated. Ensure students know how to adjust the width of a column to show a long fieldname in full.</p> <p>Use the example in Study Module 4, page 2 to illustrate the importance of meaningful and formatted names for fields.</p> <p><b>Optimising presentation by hiding columns</b></p> <p>The table on page 3 shows most of the data in the text lines above it. Ask students what happened to the missing data. If they do not mention hidden columns, explain that the data is there but hidden to get more important data into view. To prove your point, tell students to look at the same table on page 8: members' address details have pushed loyalty scheme information off the screen.</p> <p>Tell students to work in pairs to complete <b>Skill Builder 4.1</b>. When they have completed all tasks they should practise hiding and unhiding columns.</p> <p>Wipe off or remove the display of the table for bank notes.</p>	10 mins
	<p><b>Sorting data</b></p> <p>Remind students of the different ways of calling the register you discussed at the start of the lesson. Then ask them for an alternative way to arrange the four records for bank notes using their denomination (£50 - £5). Introduce the terms <b>descending</b> and <b>ascending</b> for numbers.</p> <p>Ask students how the four records could be rearranged by using one of the text field names. Check they understand descending (A-Z) and ascending (Z-A) with letters.</p> <p>Use the example in Study Module 4, Section B, Sorting data to illustrate sorting records in descending and ascending order (numbers and text).</p> <p>Ask students to complete <b>Skill Builders 4.2</b> and <b>4.3</b>.</p>	15 mins

Lesson 6	Study Module 4: Working with structured data (1/3)	Time
	<p><b>Plenary</b></p> <p>Remind students of the learning objective and recap on what they have learnt in this and previous lessons.</p> <p>As an aside, ask students what they thought of the website you used at the beginning of the lesson, how they would rate it. If they could not read the website address, tell them the web pages were from the Bank of England website.</p> <p>Ask students to recall Lesson 4 and the rating criteria for websites they used (validity, accuracy and authority) - how would they rate the Bank of England and why?</p>	5 mins
	<p><b>Homework</b></p> <ol style="list-style-type: none"> <li>1. Design and create a five-column table for books, cars, or mobile phones.</li> <li>2. Devise a unique identifier and choose a meaningful name for it.</li> <li>3. Format the fieldnames in the header row so that they stand out and are easy to read.</li> <li>4. Create six records by entering data for six different items.</li> <li>5. Present the six records sorted in three different ways.</li> </ol> <p><i>Note: consider giving Level 1 students a unique identifier, e.g. ISBN for books, serial number for mobile phones.</i></p> <p><i>A table structure for holding details of cars might have these fields: Registration number, Make, Model, Engine size, Fuel (diesel/petrol)</i></p>	20 mins