purple mash

Computing Scheme of Work

Unit 4.3 – Spreadsheets

Contents

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Introduction

These spreadsheet lessons have been designed to be used on a range of devices including tablets. We advise when you are dealing with larger spreadsheet data sets then laptops or desktops are the preferred devices.

2Calculate is a simple to use spreadsheet (and more!) for beginners and beyond.

A user guide can be found at 2Calculate User Guide.

The following guide contains a Scheme of Work for teaching the use of spreadsheets as part of the Computing curriculum.

The lessons show a progression of knowledge and skills from lesson to lesson and year to year. Children who have not used 2Calculate before will benefit by using the crash course. Teachers who are not familiar with the tools in 2Calculate might find reviewing the lessons for younger children helpful to build up their own knowledge.

Differentiation

The use of spreadsheets has a strong link to mathematics. Some children might have difficulty with the mathematical concepts in some lessons and might need guidance with this aspect. For example, in lessons where spreadsheets are being used to add up prices; children who are not familiar with converting pence (45p) to pounds (£0.45) might need this aspect explained in more details; in lessons dealing with percentages and fractions some children might need extra support for the mathematical concepts.

Where appropriate, guidance has been given on how to simplify tasks within lessons or challenge those who are ready for more stretching tasks. The lesson plans are progressive so if a child has not completed plans from a previous year, there might be tools that they are unfamiliar with and will need extra guidance.

If children have not used and logged onto Purple Mash before then they will need to spend some time before starting these lessons, learning how to do this. Young children can be supported by having their printed logon cards (produced using Create and Manage Users) to hand.

Note: To force links within this document to open in a new tab, right-click on the link then select 'Open link in new tab'.

Year 4- Medium-Term Plan

Lesson	Title	Aims (Objectives)	Success Criteria
1	Formula Wizard and Formatting Cells	• To explore how the numbers entered into cells can be set to either currency or decimal. • To explore the use of the display of decimal places. • To find out how to add formulae to a cell.	• Children can use the number formatting tools within 2Calculate to appropriately format numbers. • Children can add a formula to a cell to automatically make a calculation in that cell.
2	Using the Timer and Spin Buttons	• To explore how tools can be combined to use 2Calculate to make number games. • To explore the use of the timer, random number and spin button tools.	• Children can use the timer, random number and spin button tools. • Children can combine tools to make fun ways to explore number.
3	Line Graphs	• To use the line graphing tool in 2Calculate with appropriate data. • To interpret a line graph to estimate values between data readings.	• Children can use a series of data in a spreadsheet to create a line graph. • Children can use a line graph to find out when the temperature in the playground will reach 20°C.
4	Using a Spreadsheet for Budgeting	• To use the currency formatting tool in 2Calculate. • To use 2Calculate to create a model of a real-life situation.	• Children can make practical use of a spreadsheet to help them plan actions. • Children can use the currency formatting in 2Calculate.
5	Exploring Place Value with a Spreadsheet	• To use the functions of allocating value to images in 2Calculate to make a resource to teach place value.	• Children can allocate values to images and use these to explore place value. • Children can use a spreadsheet made in 2Calculate to check their understanding of a mathematical concept.

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Lesson 1 – Formula Wizard and Formatting Cells

Aims

- To explore how the numbers entered into cells can be set to either currency, decimal or fraction.
- To explore the use of the display of decimal places.
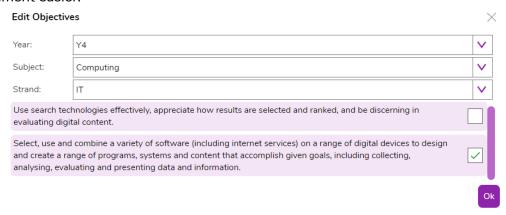- To find out how to add formulae to a cell.

Success Criteria

- Children can use the number formatting tools within 2Calculate to appropriately format numbers.
- Children can add a formula to a cell to automatically make a calculation in that cell.

Resources

Unless otherwise stated, all resources can be found on the main unit 4.3 page. From here, click on the icon to set a resource as a **2Do** for your class. Use the links below to preview the resources; right-click on the link and 'open in new tab' so you do not lose this page.

- Sample file - Spelling Scores; set this as a 2Do for your class.
- You can select the following ticked objective when setting the 2Do to make future assessment easier:

Activities

Introduction	**Be aware of children's mathematical understanding of percentages and decimal places * Adaption can be made.**
	Display **slide 2** and outline the lesson aims.
	Display **slide 3** and outline the success criteria.

Background: Formula Wizard & Formatting Cells.	Display **slide 4.** Reveal with the children the key vocabulary and tools that they will need for this lesson. You might need to adapt mathematical terms to suit ability of children within the class.
Spelling Scores	Use **slide 5**. Ask children to open the sample spreadsheet Spelling Scores on their devices. Reveal the questions on the slide to discuss as a class.
Activity 1: Formatting Cells (%)	Display **slide 6**. Support children with selecting all cells which require percentages format and use formatting tool to change it to this format.
Activity 2: Formula Wizard (Calculating Percentages)	Use **slide 7**. Working with the children, solve calculating percentages for 'Thomas'.
	Use **slide 8**. Children have a go at working out percentages for 'Olivia' independently. Challenge to set decimal places. ***You might choose to leave this out and just focus on 0 d.p.**
Activity 3: Copying and Pasting Formula for Efficiency.	Use **slide 9**. Children copy and paste formula to complete the percentages. Be aware copy and pasting of formula is only possible column at a time. ***iPads - This is possible using a tablet (iPad) if you press and hold cell D4 until a blue border appears around the cell, press on the bottom blue border and then drag down through D5, D6 all the way to D12.**
Activity 4: Averages	Use **slide 10**. Children calculate average score use 'Average' function in the Formula Wizard. ***iPad -Dragging down from the first to the last cells that are going to be used to calculate the average is possible on a tablet (iPad).**
Activity 5: Extension	Display **slide 11**. Children explore the minimum and maximum function in the advanced formula wizard.
Vocabulary Overview	**Slide 12** can be used to review lesson vocabulary. Click on the words to reveal the definitions.
Review Success Criteria	Display **slide 13.** Review the success criteria from **slide 3.** Children could rate how well they achieved this using a show of hands.

Lesson 2 – Using the Timer and Spin Buttons

Aims

- To explore how tools can be combined to use 2Calculate to make number games.
- To explore the use of the timer, random number and spin button tools.
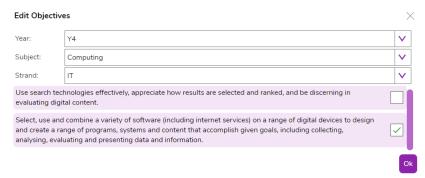
Success Criteria

- Children can use the timer, random number and spin button tools.
- Children can combine tools to make fun ways to explore number.

Resources

Unless otherwise stated, all resources can be found on the main unit 4.3 page. From here, click on the icon to set a resource as a **2Do** for your class. Use the links below to preview the resources; right-click on the link and 'open in new tab' so you do not lose this page.

- Maths Game Example

- You can select the following ticked objective when setting the 2Do to make future assessment easier:

NB Part of the lesson plan takes children through the process of creating their own copy of this spreadsheet, if this is too difficult for some children, set the completed sheet as a 2Do. Then they can open the example sheet and adapt it as is suggested in the lesson activities.

All tools can be found in the Controls Toolbox on the right-hand side of the screen, rightmost tab.

Activities

Introduction	***Be aware of children's mathematical knowledge of times tables and number bonds. Adapt as appropriate.** Display **slide 2** and outline the lesson aims. Display **slide 3** and outline the success criteria.
Background: Creating Number Games	Use **slide 4.** Share with the class the key vocabulary and tools in 2Calculate they will be using today.
Activity 1: Exploring a Maths Game	Use **slide 5**. Open the example (children to load their set 2Do version also). Explore the game and its functions.
	Use **slide 6**. Identify when we change the spinning tool that all numbers change in column (c) by a value of 1.
Activity 2: Playing the Maths Game	Use **slide 7**. Children play the maths game, following the steps and explore.
Activity 3: Adapting or Making Your Own Game.	Use **slide 8.** Children adapt the copy of the spreadsheet to make their own version of the game. For those more confident, they can make a new sheet.
Activity 4: Extension	Display **slide 9**. Children attempt to make their own times table test machine.
Vocabulary Overview	**Slide 10** can be used to review lesson vocabulary. Click on the words to reveal the definitions.
Review Success Criteria	Display **slide 11.** Review the success criteria from **slide 3.** Children could rate how well they achieved this using a show of hands.

Lesson 3 – Line Graphs

Aims

- To use the line graphing tool in 2Calculate with appropriate data.
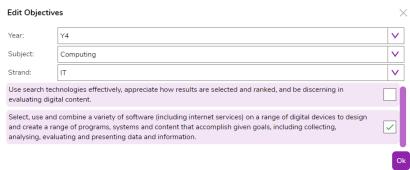- To interpret a line graph to estimate values between data readings.

Success Criteria

- Children can use a series of data in a spreadsheet to create a line graph.
- Children can use a line graph to find out when the temperature in the playground will reach 20°C.

Resources

Unless otherwise stated, all resources can be found on the [main unit 4.3 page](#). From here, click on the icon to set a resource as a **2Do** for your class. Use the links below to preview the resources; right-click on the link and 'open in new tab' so you do not lose this page.

- [Line Graph example data photo](#); **the lesson uses example data; you could collect similar real data in advance of the lesson to make the activity more relevant to the children.**

- [Blank Simple Leaflet](#): set as a 2Do if you wish children to save screenshots of the graphs (see Activity 3)
- Activities You can select the following ticked objective when setting the 2Do to make future assessment easier:

Introduction	Display **slide 2** and outline the lesson aims.
	Display **slide 3** and outline the success criteria.
Background: Line Graphs	Use **slide 4.** Share with the class the key vocabulary and tools in 2Calculate we will be using today.
Activity 1: Entering Data into 2Calculate	Display **slide 5.** Explore the example data shown on the slide with the children. Launch 2Calculate with the children on their devices. Children to enter data they can see into a table.

Activity 2: Creating the Line Graph	Use **slide 6.** Demonstrate creating a line graph using the chart button. Children to then try themselves on their 2Calculate file and try and answer the questions revealed on the slide.
Activity 3: Adding Another Data Set	Use **slide 7** to support children in adding another data set. Children to attempt to answer the questions revealed on the slide. If you wish the children to save the charts, set the 2Publish Plus template 'Blank Simple Leaflet' as a 2Do, children should screenshot and save the graphs*. They can then open the leaflet 2Do and insert the saved graphs into the picture boxes by uploading the images from their device. The method will need to be demonstrated to children. *The method will depend upon device type and operating system. On a Windows PC press the windows button + Shift + 's' to open the snipping tool: children will need to be shown how to snip and save the snip. On an apple tablet, screen shots are often made by pressing the home and on\off keys together, on Android by pressing on\off key and volume button or swiping the screen up and then you get the option to screenshot: children will need to be shown how to screenshot then crop and save the image.
Activity 4: Extension	Use **slide 8** to introduce an extension activity where children explore using other data to create a line graph.
Vocabulary Overview	**Slide 9** can be used to review lesson vocabulary. Click on the words to reveal the definitions.
Review Success Criteria	Display **slide 10.** Review the success criteria from **slide 3.** Children could rate how well they achieved this using a show of hands.

Lesson 4 – Using a Spreadsheet for Budgeting

Aims

- To use the currency formatting tool in 2Calculate.
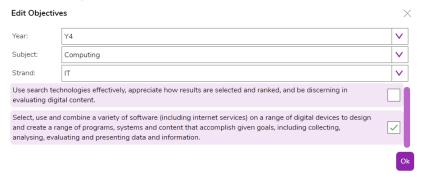- To use 2Calculate to create a model of a real-life situation.

Success Criteria

- Children can make practical use of a spreadsheet to help them plan actions.
- Children can use the currency formatting in 2Calculate.

Resources

Unless otherwise stated, all resources can be found on the main unit 4.3 page. From here, click on the icon to set a resource as a **2Do** for your class. Use the links below to preview the resources; right-click on the link and 'open in new tab' so you do not lose this page.

- Party items price list file. Or PDF version
- Example budget sheets; budget sheet no formulae and budget sheet with formulae there are 2 versions of this sheet. The simpler version (budget spreadsheet no formulae) does not use formulas. The more advanced version (budget spreadsheet with formulae) uses formulae. If children are familiar with the formula wizard from previous lessons, they can use the formula version but some children might find the simpler version enhances their understanding of the process.
- Activities You can select the following ticked objective when setting the 2Do to make future assessment easier:

Activities

Introduction	Display **slide 2** and outline the lesson aims.
	Display **slide 3** and outline the success criteria.
Background: Planning a Party	Display **slide 4.** Share with the class the key vocabulary and tools in 2Calculate the children will be using. Explain they will be planning a party with a budget using a spreadsheet.
Party Price List	Display **slide 5**. Launch the Party Price List file for children to see to get an idea of what they would include for their party. Explain that cells with prices in are formatted as currency using the format cell toolbox.
Exploring an Example Budget Sheet	Display **slide 6.** Launch example budget sheet and reveal prompts. Children look at their copies and explore the layout, content and use of total tool. ***There are two budget sheet versions for you to decide which one to share – No formula and with formula.**
Activity 1: Making a Budget Sheet	Display **slide 7.** Ask children to make their own budget sheet using the key requirements revealed on the slide e.g., formatting cells. ***To save time, you might let the children adapt the example budget spreadsheet shown on slide 6 rather than start from scratch.**
Activity 2: Sudden Changes	Display **slide 8**. Go through the sudden changes shown on the slide and ask children to modify their budget spreadsheets to accommodate these changes.
Activity 3: Extension	Display **slide 9** to introduce an extension activity. Tell the children the budget has gone down to £100. Ask them to consider the changes they will make and justify why.
Vocabulary Overview	**Slide 9** can be used to review lesson vocabulary. Click on the words to reveal the definitions.
Review Success Criteria	Display **slide 10.** Review the success criteria from **slide 3.** Children could rate how well they achieved this using a show of hands.

Lesson 5 – Exploring Place Value with a Spreadsheet

Aim

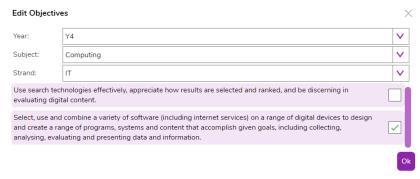- To use the functions of allocating value to images in 2Calculate to make a resource to teach place value.

Success Criteria

- Children can allocate values to images and use these to explore place value.
- Children can use a spreadsheet made in 2Calculate to check their understanding of a mathematical concept. Ma

Resources

Unless otherwise stated, all resources can be found on the main unit 4.3 page. From here, click on the icon to set a resource as a **2Do** for your class. Use the links below to preview the resources; right-click on the link and 'open in new tab' so you do not lose this page.

- Example file - Place Value Resource; this is the finished game. **Set as a 2Do.**
- This activity can be made easier by just doing hundreds, tens and units or tens and units. You could challenge more able children to include tens of thousands. There are finished examples of these in the Maths Place Value category of Purple Mash.
- Activities You can select the following ticked objective when setting the 2Do to make future assessment easier:

Activities

Introduction	Display **slide 2** and outline the lesson aim. Display **slide 3** and outline the success criteria.
Vocabulary	**Slide 4** can be used to introduce new vocabulary. The new vocabulary is repeated at the end of the lesson where it can be used to review lesson vocabulary.
How a Place Value Resource Works	**Use slide 5** to introduce a pre-built 2Calculate place value resource. Launch the example file to demonstrate and also ensure children launch their copy on their devices so they can explore with you.
	Display **slide 6** and explore with the children the images. Key points to discuss and identify are that each image has a value and that they are moveable.
	Display **slide 7,** focussing on the totalling tool and what happens when an image is dragged in a column with this tool in it. Look at the 'Is equals to' tool and remind children of its use.
Activity 1: Trying a Place Value Resource	Use **slide 8** to support modelling of trying out the place value resource. Children to have a go on their copies of the resource too. ***Dragging is possible with a tablet (iPad) but is a little easier using a laptop / desktop machine. A discussion about suitability of device for task could take place here.**
Activity 2: Making a Place Value Resource	**The following slides show further details of how to create features shown in the place value resource. You might choose to omit some to provide more challenge for your children.** Display **slide 9**. Children to create their own place value resource. They might find it useful to refer to the example spreadsheet. You should remind them about headings and the totalling tool. Slide 8 shows how to insert an image from a file location where you have saved the maths images and how to give an image a value. ***You could ask children to adapt the example file for those less confident, otherwise leave the example file on the whiteboard for children to copy.**
	Display **slide 10** to model how to make an image draggable and how to copy images quickly.
	Display **slide 11** to show children the correct formula to enable 'number to make' to show in cell (I12).
Vocabulary Overview	**Slide 12** can be used to review lesson vocabulary. Click on the words to reveal the definitions.
Review Success Criteria	Display **slide 13.** Review the success criteria from **slide 3.** Children could rate how well they achieved this using a show of hands.

Assessment Guidance

The unit overview for year 4 contains details of national curricula mapped to the Purple Mash Units. The following information is an exemplar of what a child at an expected level would be able to demonstrate when completing this unit with additional exemplars to demonstrate how this would vary for a child with emerging or exceeding achievements.

Assessment Guidance	
Emerging	With support throughout, children will use 2Calculate and a limited data set to design a simple graph to solve a mathematical problem (Unit 4.3 Lesson 3). Children will present their data and information using 2Calculate (Unit 4.3 Lesson 5).
Expected	Children will use 2Calculate to design a graph to solve a mathematical problem (Unit 4.3 Lesson 3). Children will present, format and analyse their data and information in a variety of ways and use their spreadsheets to solve and check mathematical problems and concepts (Unit 4.3 Lesson 5). Most children can use the number formatting tools within 2Calculate to appropriately format numbers (Unit 4.3. Lesson 1). Children can add a formula to a cell to automatically make a calculation in that cell using the 'formula wizard' (Unit 4.3. Lesson 1). They will be fluent in copying and pasting contents between cell(s) (Unit 4.3. Lesson 1). Children can use spreadsheets to collate data and extract information from it to answer questions e.g., children can create line graphs and can use it to identify when something will happen using 2Calculate (Unit 4.3 Lesson 3).
Exceeding	Children demonstrating greater depth will explore more complex functioning of the 2Calculate tools to create their own spreadsheets to explore number and interpret their own data. They will intuitively grasp the concept of using a spreadsheet to model a real-life situation and calculate solutions. Children demonstrating greater depth will use 2Calculate to design a range of different graphs which present data in a variety of ways and select the most appropriate one to independently to solve mathematical problems (Unit 4.3 Lesson 5).

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