purple mash

Computing Scheme of Work

CRASH COURSE

Year 4 Spreadsheets Catch-up

For children in year 4 who haven't used 2Calculate before.

Year Group: 4
Number of Lessons: 5

From 2simple

Contents

Introduction

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 catch-up unit of work forming part of the Computing Scheme of Work for teaching the use of spreadsheets. It is aimed at classes in which the children have not used 2Calculate before.

The lessons assume that children are logged onto Purple Mash with their own individual usernames and passwords so their work will be saved in their own folders automatically and can be easily reviewed and assessed by the class teacher.

If you are currently using a single login per class or group and would like to set up individual logins yourself, then please see our guide to doing so at Create and Mange Users. Alternatively, please contact support at support@2simple.com or 0208 203 1781.

Differentiation

If children are not familiar with computer keyboards and mice and are going to be using 2Calculate on computers rather than tablets, then they would benefit from doing some work to familiarise themselves with the keys such as the arrow keys, enter and space.

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.

Purple Mash Tools used in this Unit

2Calculate

Year 4

Lesson	Aims	Success Criteria
1	Introduction to spreadsheets	• Children can navigate around a spreadsheet. • Children can explain what rows and columns are. • Children can enter data including text, numbers and images into cells. • Children can use the Move Cell and Lock tools.
2	To introduce the Advanced Mode of 2Calculate and use coordinates.	• Children can describe a cell location in a spreadsheet using the notation of a letter for the column followed by a number for the row. • Children can find specified locations in a spreadsheet.
3	Using the formula wizard in the advanced mode to add formulae and explore formatting cells.	• 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.
4	Using a spreadsheet for budgeting	• Children can make practical use of a spreadsheet to help them plan actions. • Children can use the currency formatting in 2Calculate.
5	Line graphs	• 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.

Lesson 1 – Introduction to spreadsheets

Aim

- To know what a spreadsheet looks like.
- To be able to navigate around a spreadsheet and enter data.
- To learn new vocabulary related to spreadsheets.
- To add clipart images to a spreadsheet.
- To use the 'move cell' and 'lock' tools.

Success criteria

- Children can navigate around a spreadsheet.
- Children can explain what rows and columns are.
- Children can save and open sheets.
- Children can open the Image toolbox and find and add clipart.
- Children can use the 'move cell' tool so that images can be dragged around the spreadsheet.
- Children can use the 'lock' tool to prevent changes to cells.
- Children can enter data into cells.

Resources

All resources can be found on the main page for this unit. From this page they can be set as 2dos if required by clicking on the icons. Open the links below in a new tab (by right-clicking on them) so that you can preview them without navigating away from the lesson plans.

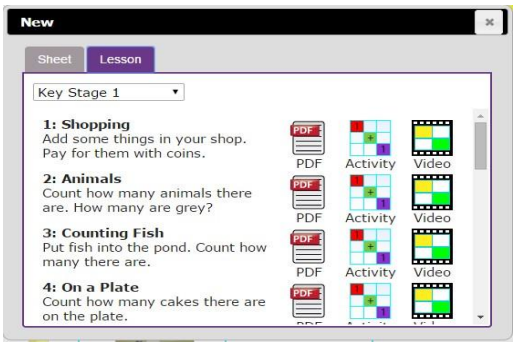
- 2Calculate Prompt sheet to display on the whiteboard.

Note for teacher: In this lesson, children are introduced to a variety of tools and time is given to allowing them to try out each in turn. Determine the time spent dependent upon the time that you have available. Alternatively, demonstrate the functions and then display the prompt sheet to help children then explore on their own.

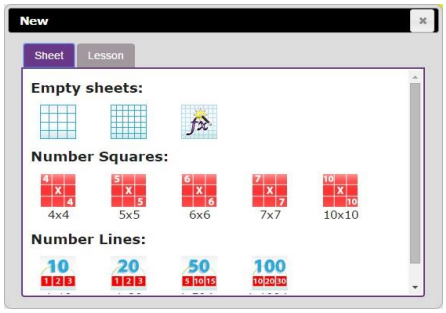
Activities

1. Explain to the children that we are looking at a type of computer program called a spreadsheet today. Spreadsheets are used for organising information. For example, if you were planning a tea party you could input to the spreadsheet all the things you will need to get for the party and who you were going to invite. Can they think of any other things that could be stored in a spreadsheet for organising a party? (menus, gift list, entertainments).
2. Many people make lists on paper but the advantage of using a spreadsheet is that it can also do calculations for you. Explain what this means e.g. you could enter the cost of the different things that you will need for your party into the spreadsheet and then easily calculate how much money you will need to buy them all.
3. The aim today is to open a spreadsheet program in Purple Mash called 2Calculate and to learn how to enter information and do some simple calculations.

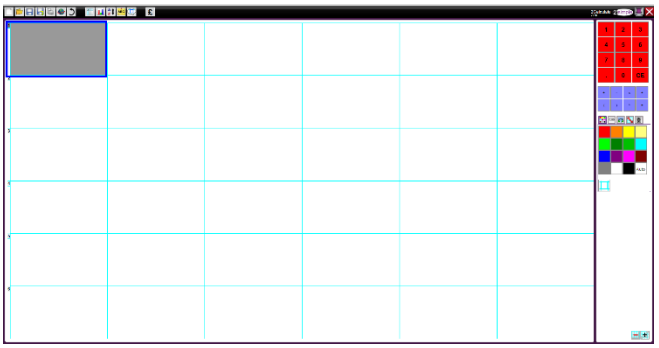
4. Open 2Calculate on the whiteboard. Show that when it starts, there is a smaller screen in the middle with different choices. The labels at the top ('Sheet' and 'Lesson') are called tabs. For today we are going to click on the 'Sheet' tab.



5. Click on the tab. This also gives a few choices but for today click on the first one: an empty sheet with big 'rectangles'.



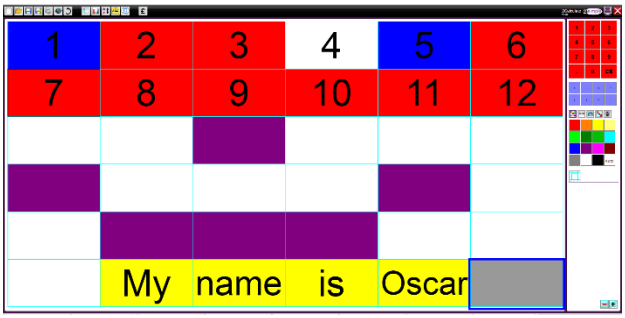
6. Spend some time showing children the following things, emphasising the new vocabulary in bold:



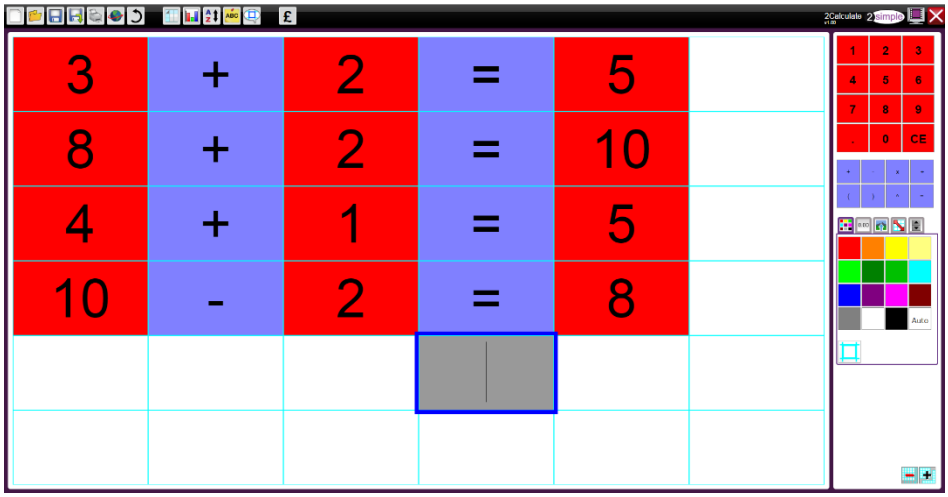
- The **rows**; these are numbered 1 to 6
- The **columns**; how many are shown?
- The word '**cells'** is used to describe each box in a spreadsheet.
- Each cell can contain words, numbers, colours, symbols (such as + - =)
- How to move from cell to cell; this can be done by clicking or tapping in the cell and by using the **arrow keys** on the keyboard. If you press the enter key when in a cell you will move down 1 row.
- How to type into cells; in 2calculate the writing will get smaller automatically to fit in the words that you type.
- How to **delete** the contents of a cell; either by using the **backspace key** or the **Delete key**.

7. Children should now spend some time opening 2Calculate on their computers and trying moving and typing. Can they enter their name into a cell?

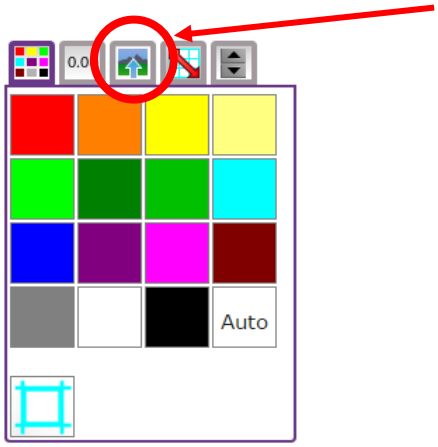
8. Let them spend some time experimenting with typing and colouring cells.
   To colour cells, they first click on the cell, then click on the colour they want in the toolbox on the right-hand side.
   If they select more than 1 cell by dragging the mouse over a few cells, then they can colour all of these cells at once.



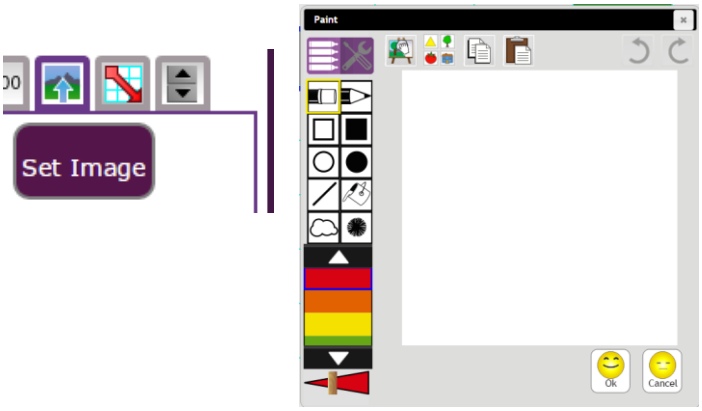
9. If the children are getting on well with this, show them how to put a simple calculation into the cells and let 2Calculate work out the answer. First enter a number then go into the next cell to the right and click the '+' sign button on the right-hand side, then move to the next cell and enter another number. Now put the '=' sign in the next cell and see how 2Calculate works out the answer.
   Children can spend time experimenting with this and making some difficult calculations.



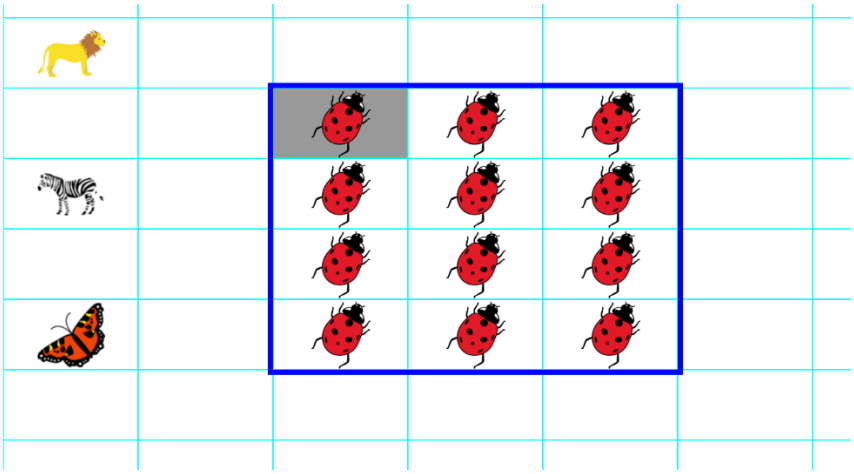
10. Next, show children where the Image toolbox is. They need to click on the images tab on the right-hand side:



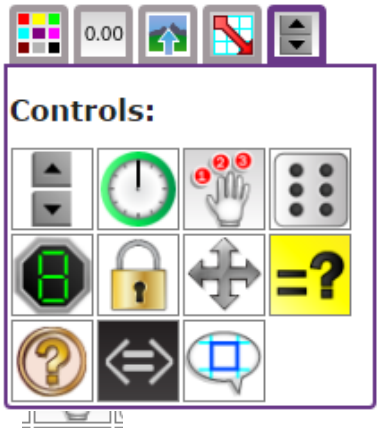
11. You will see a selection of coin images which will be useful later but for now, click on the 'Set Image' button to open the following screen.



12. Click on the clipart button  to open the clipart picker. Show the children the different choices of topics and go to the Animals option (children could choose other items if they wish).
13. Select an animal and click on the OK button to add it to the spreadsheet. Add 2 further animals in the same way in different cells. You could show children that if they select more than one cell when adding images then they will get multiple copies of the same image.



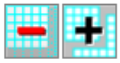
14. Show the children that you can't drag the animals around into different cells (cages?).
15. Click on one of the animals then click on the Controls toolbox

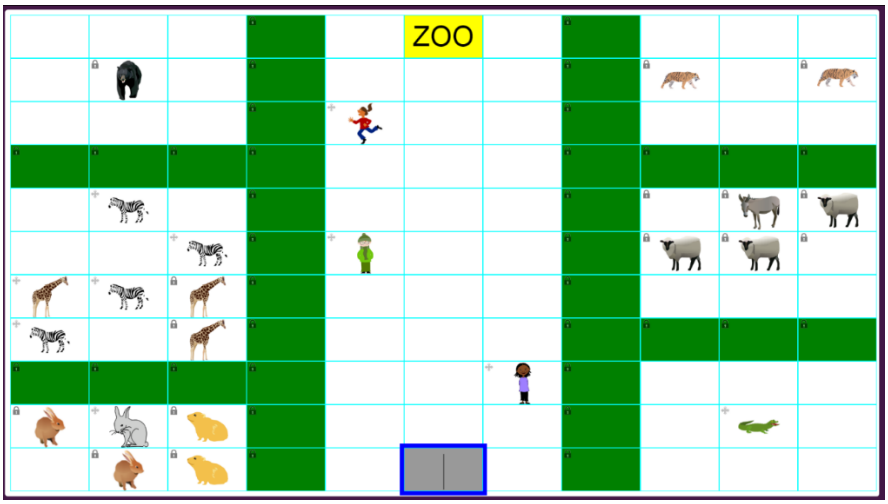


16. Now click on the 'move cell' tool  . A little symbol will appear in the top right-hand corner of the image to show that it is now moveable. Try dragging it into a different cell.

17. This can also be done with several images selected at once to save doing it many times.
18. Show the children what happens to the ladybirds when the lion is dragged onto them. To prevent this, you can lock the ladybird cells, so they can't be overwritten. To do this click on the cell that you want to lock, then click on the lock cell tool 
19. Explain to children that this tool can be useful for other things too; such as when you have numbers or cells that you don't want to be accidently changed.

    Give children the opportunity to experiment with the lock and move tools. They could try making a 'zoo' by colouring cells to make walls and locking them so they can't be changed and then locking or unlocking and moving animals into their cages/cells.

    NB If children find that their spreadsheets are too small and need more cells click on the + in the button on the bottom right of the screen to add more cells. 



Lesson 2 – Advanced Mode and Coordinates

Aim

- To introduce the Advanced mode of 2Calculate.
- To learn about describing cells using their coordinates.

Success criteria

- Children can describe a cell location in a spreadsheet using the notation of a letter for the column followed by a number for the row.
- Children can find specified locations in a spreadsheet.

Resources

All resources can be found on the main page for this unit. From this page they can be set as 2dos if required by clicking on the icons. Open the links below in a new tab (by right-clicking on them) so that you can preview them without navigating away from the lesson plans.

- Advanced Mode example 1.
- Advanced Mode example 2.; you will need to save this and set as a 2Do for your class.
- Advanced Mode example 3. Set this as a 2Do for the class.

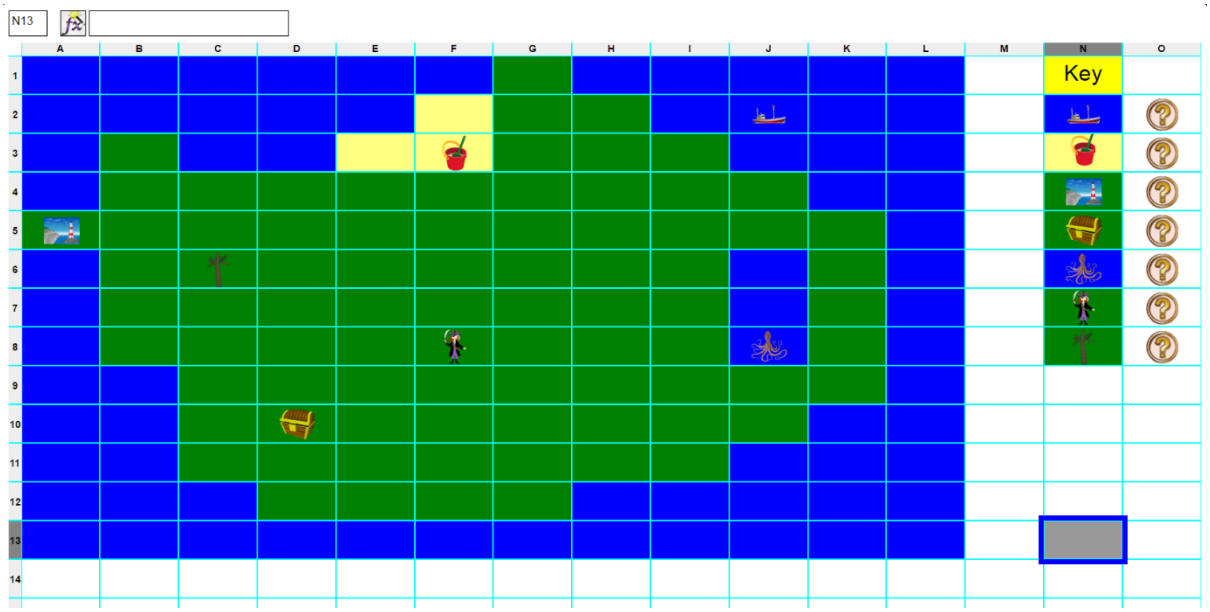
Activities

1. Show children how to switch to the Advanced mode of 2Calculate by clicking on the mode switch button at the top of the screen:

2. Notice that in Advanced mode, the rows are numbered, and the columns have letters to label them.
3. Spend a few minutes asking children to tell you which cell you have clicked on, clicking on a different cell each time.
4. Open the first example spreadsheet. On this sheet, the key to the right-hand side shows which cells should be which colour. As a class, colour the cells; you should end up with a picture of a tree.
5. Children can now open example 2; make sure that they are in Advanced mode and try to work out what the image is.
6. Any children who finish quickly could try making their own key to an image and seeing if a friend can solve it.
7. When children have had time to finish, bring the class back together and open the Treasure Map example file. Children must click on the Quiz tool cells  and enter the coordinates of the item. If they enter correctly, their answer will replace the Quiz tool.
8. Children can complete the activity at their computers and then create their own treasure maps to swap with a partner using the Quiz tool to hide the locations.

9. Alternatively, they could fill in the map key with the objects and locations and their partner should put the correct items in the correct locations. They can use copy and paste to do this (Ctrl + C to copy, Ctrl + V to paste).

Treasure Map example file



Lesson 3 – Formula Wizard and Formatting cells

Aim

- 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

All resources can be found on the main page for this unit. From this page they can be set as 2dos if required by clicking on the icons. Open the links below in a new tab (by right-clicking on them) so that you can preview them without navigating away from the lesson plans.

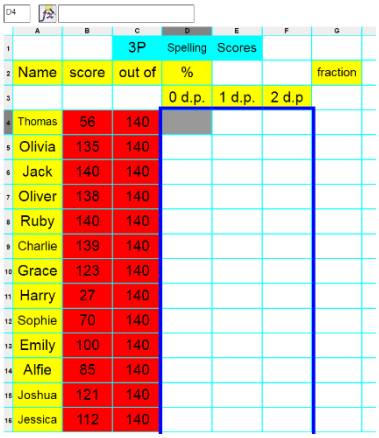
Spelling Competition Example set this as a 2do for your class. Children should open the file and then save it to their own work folder to create their own copy.

Activities

1. Remind children how to switch to the advanced mode of 2Calculate by clicking on the mode switch button at the top of the screen:

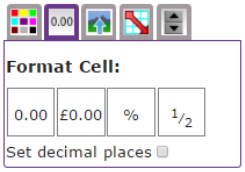
2. Open the sample spreadsheet; spelling scores. Explain that class 3P had a spelling competition and these are the scores. The test was out of 140.
3. Discuss with children what percentage means? What is the most that you can get as a percentage and what is the least? What percentage would mean that you got half correct?

4. 2Calculate can format cells in different ways to make performing calculations easier. One of these ways is as a percentage. Show the children how to select all the cells which will eventually contain percentages.

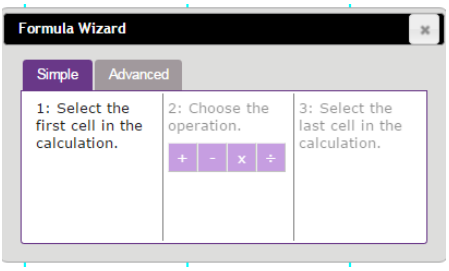


		3P	Spelling	Scores		
Name	score	out of	%			fraction
			0 d.p.	1 d.p.	2 d.p	
Thomas	56	140				
Olivia	135	140				
Jack	140	140				
Oliver	138	140				
Ruby	140	140				
Charlie	139	140				
Grace	123	140				
Harry	27	140				
Sophie	70	140				
Emily	100	140				
Alfie	85	140				
Joshua	121	140				
Jessica	112	140				

5. Next click on the Format Cell toolbox and select the % format:



6. We will be discussing decimal places later in the lesson so do not set these for now.
7. Explain that 2Calculate also has a 'formula wizard' which you can use to help calculate the required calculations. Click on cell D4 then click on the formula wizard button  this will open the Formula Wizard screen in simple mode.



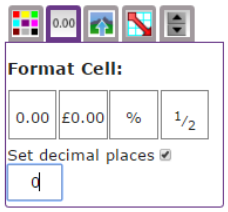
8. Click on cell B4 (Thomas' score) then choose ÷ as the operator (on the wizard screen), then click on cell C4 followed by 'Ok'. Now we can see that Thomas got 40%.
9. Depending upon the children's maths ability, you might want to discuss the calculation of percentages here for further understanding.
10. Repeat this process for Olivia. You will see that the percentage is reported as 96.43%. This is because 2Calculate has calculated to 2 decimal places automatically.

11. Calculate the result for Olivia into cells E5 and F5 as well.

	A	B	C	D	E	F	G
1			3P	Spelling	Scores		
2	Name	score	out of	%			fraction
3				0 d.p.	1 d.p.	2 d.p	
4	Thomas	56	140	40%			
5	Olivia	135	140	96.43%	96.43%	96.43%	
6	Jack	140	140				

12. The general level of children's maths ability will determine in how much depth you discuss what decimal places mean and whether this number is nearer to 96% or 97%? If this is felt to be too complicated, then just fill in the 0 d.p. column and explain that this will show the nearest whole percentage.

13. Now click in cell D5 which should be set to show the answer to 0 decimal places. In the format cell toolbox (right-hand side), tick the 'Set decimal places' tickbox and type '0' then press the 'enter' key on the keyboard.



14. Repeat this for cell E5 setting decimal places to 2.

15. Before sending the children to their own computers to try for themselves, explain that it is easier to set the format for lots of cells at once by selecting all the relevant cells e.g. the 0 d.p. column and set the number of decimal places. Then repeat for 1 d.p. and 2 d.p.

16. It is also possible to copy and paste a formula down the column e.g. use the formula wizard to work out the formula for cell D4, then copy D4 and paste to all the other cells in the D column (but not to the other columns as this will not work).

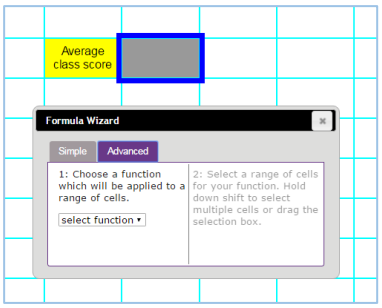
17. Copying and pasting reminder:

18. Copying	19. Cutting	20. Pasting
21. Ctrl + C	22. Ctrl + X	23. Ctrl + V

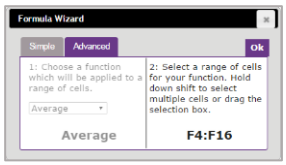
24. Now give children time to complete this on their own copies of the spreadsheet.

25. When children have finished, discuss who got the top score and the bottom score? How can we work out the average score? The Formula wizard in 2Calculate can work this out for us as well.

26. Into cell I5 enter the text ‘average class score’ then click on cell J5. Format this cell as a % to the desired number of decimal places. Now click on the formula wizard button and choose the Advanced tab.



27. Select the function ‘Average’, then select the cells with the results (could be any of the d.p. columns). Then click ‘OK’ and you should see the average percentage was 76.15%.



28. Children should try this on their own spreadsheets, they could also explore what minimum and maximum functions do.

Aim

- 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

All resources can be found on the main page for this unit. From this page they can be set as 2dos if required by clicking on the icons. Open the links below in a new tab (by right-clicking on them) so that you can preview them without navigating away from the lesson plans.

- Party items price list file.
- 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 formulas. 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.

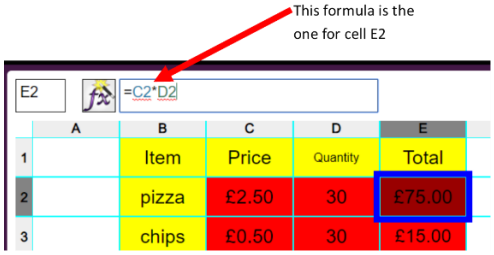
Activities

1. Explain that the children are going to use a spreadsheet to plan their birthday party and decide which entertainments and food they can afford within their party budget.
2. Show the children the price list on the whiteboard, they will have to decide which items to include in their party, how many people they can afford to invite and what to feed them. Note that the cells with prices in are all formatted as currency using the Format cell toolbox; children should do this on their spreadsheets too (in the same way as they formatted as percentage last lesson).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Food	Cost per person		Drinks	Cost each		Entertainment	Cost each		venue	Cost each		decorations	Cost each
2	pizza	£2.50		milkshake	£1.25		DJ	£150.00		home	£0.00		party poppers	£0.10
3	sandwich	£1.00		fizzy can	£0.50		fireworks display	£75.00		local hall	£40.00		plates	£0.02
4	hotdog	£1.15		big bottle fizzy	£0.40		sports activities	£100.00		bowling to include activity	£150.00		themed plates	£0.10
5	vegetables	£0.30		bottled water	£0.10		magican	£100.00		swimming to include activity	£170.00		cups	£0.01
6	burger	£2.00		fruit juice	£0.60		animal man	£150.00		astroturf pitches to include activity	£150.00		themed cups	£0.05
7	chips	£0.50		tap water	£0.00		DIY games	£25.00		soft play	£170.00		tablecloths	£1.00
8	nuggets	£2.00		squash	£0.15		movie	£5.00					helium balloons	£4.00
9	pasta	£1.50		ice crush	£1.50		pinata	£20.00		Going home gifts	Cost each		banners	£2.00
10	basic crisps	£0.10								toy	£0.50			
11	deluxe crisps	£0.15		Invitations	Cost each					helium balloon	£1.00			
12	popcorn	£0.12		DIY	£0.20					hat	£0.10			
13	fruit salad	£0.30		printed	£1.00					book	£1.00			
14	cup cake	£0.20								chocolate	£0.20			
15	deluxe cake	£0.40								sweets	£0.20			
16	ice cream	£0.30												

3. Show children the example budget sheet (see resources section for information about which example budget sheet to use). Highlight the places where there are calculations, e.g. to work out

the totals and grand total (If you click in the cell, you can see the formula in the advanced bar at the top:



Simpler

spreadsheet

Advanced spreadsheet

4. Children should create their own version of the example for their party. They should use the calculations functions to work out the costs because otherwise it will be very hard to change things if the prices change or there are more children to invite or the budget is reduced. Initially, there is no spending limit and they can invite as many people as they want.
    - Can they work out a total cost for their chosen party?
5. Once they have had a chance to do this give the children some restrictions:
    - Certain venues have maximum number limits so they might have to change venue or invite less people; can they change their spreadsheet to reflect their choices?
    - There is a maximum budget for the party of £300 can they plan a party that doesn't cost too much?
    - There is currently a special sale on pizza; now half price! Can they work out the new cost quickly?
    - The entertainer has added 20% to their bill to cover damage, what things need to be excluded now so that the party is still in budget?
6. If children have done work in 2Email, they could email you their budgets as an attachment along with a letter about how they have chosen their desired party.

Lesson 5 – Line Graphs

Aim

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

Success criteria

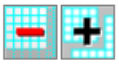
- Children can use a series of data in a spreadsheet to create a line graph.
- Children can use a line graph to find out when the temperature in the playground will reach 20°C.

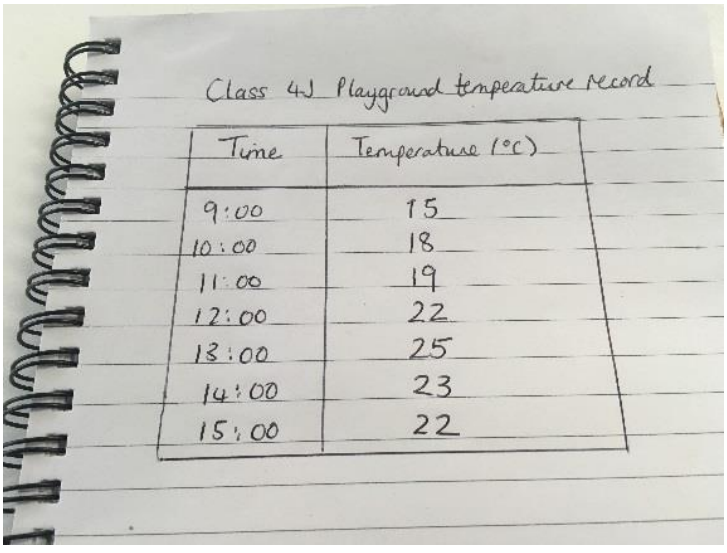
Resources

All resources can be found on the main page for this unit. From this page they can be set as 2dos if required by clicking on the icons. Open the links below in a new tab (by right-clicking on them) so that you can preview them without navigating away from the lesson plans.

- 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.

Activities

1. Create a blank worksheet by clicking on the new page icon at the top left of the screen.
2. You will probably have to resize the spreadsheet using the  buttons in order to fit in the data. These buttons can be pressed at any time if you are running out of space and then the data can be copied and pasted into different cells if necessary.
3. Class 4J collected data on the daytime temperature in the school playground. They recorded the temperature each hour during the day.
4. Here is their record of the data (this photo is linked to above for displaying on a whiteboard):

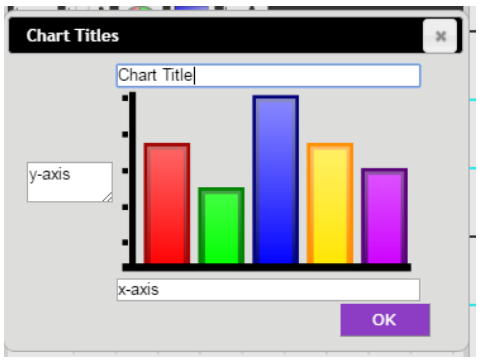


5. Ask the class to put the data into a spreadsheet and then review what children have done. The expected outcome is like this:

Time	Temperature
9:00	15
10:00	18
11:00	19
12:00	22
13:00	25
14:00	23
15:00	22

6. Now we are going to create a line graph to help us figure out what time the playground reached 20°C.
7. Click on the Charts button in the top menu bar  . This button will try to find all the relevant data in your spreadsheet and create a chart using it.
8. If the tool does not find all your data, you can drag the dotted lines (that will appear) to select the data that you want to include in your chart.
9. The default chart is a bar chart. Use the buttons within the chart pop-up screen to change to a line graph.

The final button in the chart pop-up screen allows you to give your chart a title, and rename the x and y axes.



10. Children should make their own graphs.

11. Can they work out at which time the playground was 20°C? What other questions can the line graph answer. Why is it better than a bar chart for this type of data?
12. Can they think of other data that could be collected and put into a line graph? Some of the information in the examples below could be researched on the Internet and plotted in a line graph such as average temperatures through the year in different countries.

Some examples;

- Age and height of a person or average height for a group of people and their age;
- Months of the year and average temperature;
- Car valuations over years since new
- Sales of TVs/mobile phones/radios over the decades.

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, children can save and open sheets (Lesson 1), enter simple data into cells (Lesson 1. Point 7), manipulate data using the 'move cell' tool (Lesson 1. Point 17) and use the image toolbox to add clipart (Lesson 1. Point 14). Children can find specific cell locations within a spreadsheet (lesson 2). Children can use the formatting (lesson 3) and totalling tools (lesson 4) but they will need support when deciding where to use them and what the information shows. With support throughout, children will use 2Calculate and a limited data set to design a simple graph to solve a mathematical problem (Lesson 5).
Expected	Most children will be able to save their 2Calculate files, using a memorable file name, to their own personal space on Purple Mash and understand that this can be retrieved later (all lessons). They can enter data into cells (Lesson 1), manipulate data using the 'move cell' tool (Lesson 1) and use the image toolbox to add clipart (Lesson 1). Children can locate cells using their cell reference in advanced mode (lesson 4) Children will use 2Calculate to design a graph to solve a mathematical problem (Lesson 5). 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 (Lessons 3 & 4). Most children can use the number formatting tools within 2Calculate to appropriately format numbers (Lesson 3). Children can add a formula to a cell to automatically make a calculation in that cell using the 'formula wizard' (Lesson 3). 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 (Lesson 5).
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 (lesson 4). 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 (lesson 5).