

YEAR 5 PLANNING

ICT: An Introduction to Spreadsheets

About this Unit

In this unit children learn how to enter formulae into a spreadsheet to perform calculations on inputted data.

Children will explore mathematical problems and learn how formulae results update automatically when values in a spreadsheet change.

Where this Unit fits in

This unit builds on earlier units about information handling and computer simulations, and assumes that children can:

- calculate total costs;
- recognise number patterns;
- use a reference to locate a square in a grid.

Vocabulary (to Introduce/Reinforce)

- calculate
- cell
- column
- formula(e)
- model
- row
- spreadsheet
- sum
- table

YEAR 5 PLANNING

ICT Year 5

An Introduction to Spreadsheets

LEARNING INTENTIONS (Children should learn...)

- **Technique:** to identify the key elements of a spreadsheet (rows, columns and cells)
- **Technique:** to reference cells in a spreadsheet

ICT KS2 PoS Links: 2c

Mathematics KS2 PoS Links:

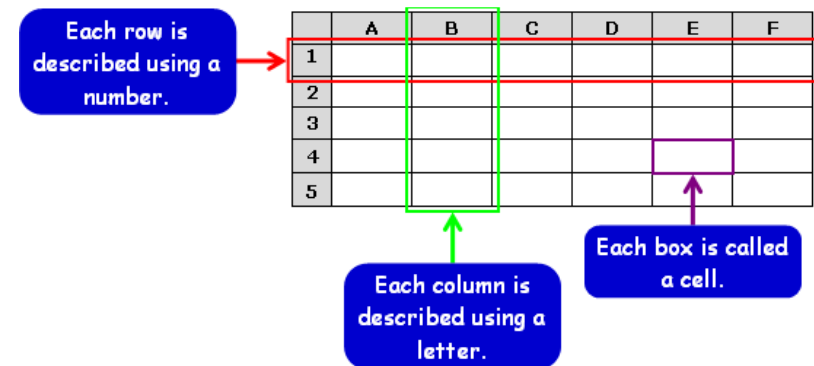
Ma3 – 4d
BoS – 1f

RESOURCES/EQUIPMENT NEEDED (inc. ICT)

- Spreadsheet file: *Wizard's Challenge*

POSSIBLE TEACHING ACTIVITIES

Point out that the screen in a spreadsheet program is made up of a large table, called a sheet:



Explain how each cell can be identified by a unique name called a cell reference. This can be worked out by writing down the letter of the column the cell is in and the number of the row it is in. It is important that children will need to know that spreadsheets operate by referring to the cell reference rather than the actual value of its contents.

Ask the children to open up the spreadsheet file called *Wizard's Challenge*, and then see if they can enter the correct cell references into the appropriate cells in the table. Highlight that they can simply click on any cell to start typing into it, and that they need to press the ENTER key once finished.

More confident children could perhaps also be shown how the arrow keys on the keyboard allow you to move from cell to cell as well.

YEAR 5 PLANNING

ICT Year 5

An Introduction to Spreadsheets

LEARNING INTENTIONS (Children should learn...)

- **Key Idea:** that a spreadsheet is used to perform calculations
- **Technique:** to enter formulae into a spreadsheet

ICT KS2 PoS Links: 2c

Mathematics KS2 PoS Links:

Ma3 – 4d

BoS – 1f

RESOURCES/EQUIPMENT NEEDED (inc. ICT)

- Spreadsheet file: *The Gold Mine*

POSSIBLE TEACHING ACTIVITIES

Talk about how spreadsheets can be used to perform calculations quickly and accurately.

Ask the children to load up the file 'The Gold Mine'. In this task they will need work out the answers to various calculations and if they are right, the cells will automatically turn gold. The file is organised into three worksheets which can be accessed by clicking on the tabs at the bottom: level 1 only contains additions, level 2 contains subtractions as well and level 3 contains multiplications and divisions as well.

Explain that they can enter formulae into cells to help work out the answers. Demonstrate how to create formulae involving the four main operators (+, -, * and / which can all be easily accessed using the numeric keypad) and emphasise how the answers to formula calculations will always appear in the cell where the formula was entered into. Point out the formula bar at the top where the formula used can be seen and how all formulae must begin with an = (equals) sign because it means 'here comes a formula' – without this the computer will mistake what you are typing as just text.

YEAR 5 PLANNING

ICT Year 5

An Introduction to Spreadsheets

LEARNING INTENTIONS (Children should learn...)

- **Key Idea:** that when you change the numbers used in a spreadsheet the results of calculations are worked out again (recalculated)
- **Technique:** to enter labels and numbers into a spreadsheet

ICT KS2 PoS Links: 2c, 4a, 4b

Mathematics KS2 PoS Links:

Ma3 – 4d
BoS – 1f

RESOURCES/EQUIPMENT NEEDED (inc. ICT)

- Microsoft *Excel*

POSSIBLE TEACHING ACTIVITIES

Explain to the children that are going to try recreating a times table in a spreadsheet. Firstly, ask them to enter these labels into a blank spreadsheet:

| | A | B | C |
|---|--------------|----------|---------|
| 1 | Times Tables | | |
| 2 | | | |
| 3 | Number A | Number B | Product |
| 4 | | | |

Next, ask them to enter the numbers 1 to 10 in the cells underneath the heading 'Number A'. After that, ask them to enter the number they want to times them by in the cells underneath the heading 'Number B'. For example, if they wanted to create the two times table, they would need to type '2' into each cell. Finally, ask them to work out the formulae they would need to type into each cell underneath the heading 'Product' to multiply the numbers in columns A and B together ($=A4*B4$). *Can you add more rows underneath to get the times table multiplying numbers up to 20? Can you change what number each of these numbers is being multiplied by?* Point out that when you change the numbers in a spreadsheet the results of calculations are worked out again automatically.

Let each child show their work to the others and explain what they did to construct/improve the multiplication tables. Discuss any problems or issues that arose. *What happens if someone makes a mistake, either with a formula or a number? How can we check for mistakes?* (idea of plausible outcomes) Re-emphasise the key points of cell reference, choice of a start number and the use of the equals sign.

YEAR 5 PLANNING

ICT Year 5

An Introduction to Spreadsheets

LEARNING INTENTIONS (Children should learn...)

- **Key Idea:** that spreadsheet models allow exploration of possible outcomes
- **Technique:** to change the data in a spreadsheet to answer 'what if?...' questions

ICT KS2 PoS Links: 2c, 4a, 4b

Mathematics KS2 PoS Links:

Ma3 – 1h, 4d
BoS – 1f

RESOURCES/EQUIPMENT NEEDED (inc. ICT)

- Spreadsheet file: *Sweets Problem*

POSSIBLE TEACHING ACTIVITIES

Introduce the spreadsheet *Sweets Problem* and the fictitious problem to the children:

"Paul wants to buy exactly 14 sweets for 10 pounds.
He also wants at least one of each sweet.
Use trial and error to find a way to buy the sweets."

Firstly, ask the children to type a formula into the two blue cells to add up the total number of sweets being bought and the total price of all the sweets. This will help them realise that formulae can contain multiple cell references.

Next, ask the children to enter numbers into the yellow cells and observe the effects on the two totals in the blue cells (i.e. encourage them to notice that the formulae results are recalculated automatically). Ask them to explore changing the quantity amounts until the two totals update to being 14 and £10.00 (through doing this they are checking to see the effects of their changes). Point out that to delete a cell value you can either select it and press delete or simply begin typing and your new value will replace it. Encourage children to spot trends in the numbers (e.g. *Can you buy more packets of jelly babies than cola bottles with £10?*).

I think there are at least three solutions to this problem. *Can you find them all?*

What are the advantages of using a spreadsheet for this task compared to pencil and paper? (It can allow us to change our minds and try out different numbers quickly and easily without lots of scruffy rubbings out)

YEAR 5 PLANNING

ICT Year 5

An Introduction to Spreadsheets

LEARNING INTENTIONS (Children should learn...)

- **Technique:** to use 'SUM' to calculate the total of a set of numbers in a range of cells

ICT KS2 PoS Links: 2c, 4a, 4b, 4c, 5c

Mathematics KS2 PoS Links:
Ma3 – 1h, 4a, 4c, 4d
BoS – 1f

RESOURCES/EQUIPMENT NEEDED (inc. ICT)

- Spreadsheet file *Race Points*
- Spreadsheet file *Lunch Box*

POSSIBLE TEACHING ACTIVITIES

Ask the children to load up the 'Race Points' spreadsheet. Discuss what formulae would need to be entered and where to help determine which child received the most points. Point out that whilst using =B10+B11+B12+B13+B14+B15 would produce a total; it would require a lot of typing. Introduce the use of =SUM(B10:B15) as a shorter way of adding up a series of numbers in a column, stressing the importance of the brackets. Give the children some time to work in the spreadsheet to determine who got the most points.

For the next task, ask the children to load up the 'Lunch Box' spreadsheet. Explain that they are going to create receipts on the computer for if different selections of food were bought for a week's worth of lunch box meals. After copying each item name and price over onto the receipt tab, ask the children to enter the appropriate formulae to calculate the total cost and the amount of change that would be received from £10. If the change due is a negative number it means that they have spent too much, and discuss which variables can be changed. They should check to see the effect of any amendments they make to their shop. *How can you check your total is reasonable?*

What did shops do to calculate using lots of numbers before computers and calculators? Discuss how this might have been done before computers and calculators. Perhaps look at pictures of adding machines, hand written ledgers, old fashioned cash registers etc.

How could you do lots of additions in a spreadsheet more quickly in the future?

YEAR 5 PLANNING

ICT Year 5

An Introduction to Spreadsheets

LEARNING INTENTIONS (Children should learn...)

- **Technique:** to add cell borders and background colours to improve the legibility of a spreadsheet table

ICT KS2 PoS Links: 2c, 4a, 5b

Mathematics KS2 PoS Links:

Ma3 – 1h, 4c, 4d
BoS – 1f

RESOURCES/EQUIPMENT NEEDED (inc. ICT)

- Microsoft *Excel*
- www.ferryhalim.com/orisinal/
- *Google Form* (for collating game scores)

POSSIBLE TEACHING ACTIVITIES

Ask the children to play a simple computer game three times and to record their scores (e.g. using a *Google Form*). Ask the children to then create a spreadsheet table to record the scores of several of their friends, and to construct formulae to work out some information about the data:

- enter =SUM() formulae to calculate the total points scored by each child;
- enter an =MIN() formula to identify the minimum total points scored by a child
- enter an =MAX() formula to identify the maximum total points scored by a child
- enter an =AVERAGE() formula to identify the average for the total points scored by the children.

Remind them to check that their formulae are correct by deciding if their results seem reasonable.

Next, allow them to improve the design of their spreadsheet to make it more attractive and easier to read by:

- adding a border around cells;
- change 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).

If time allows, the data in spreadsheet could easily be edited – perhaps with scores from a different game/different children to see how the statistical information (formulae) update automatically.

YEAR 5 PLANNING

ICT Year 5

An Introduction to Spreadsheets

LEARNING INTENTIONS (Children should learn...)

- **Key Idea:** that mathematical problems can be explored using a spreadsheet

ICT KS2 PoS Links: 2c, 4a, 4b, 4c, 5c

Mathematics KS2 PoS Links:
Ma3 – 1h, 4a, 4c, 4d
BoS – 1f

RESOURCES/EQUIPMENT NEEDED (inc. ICT)

- Spreadsheet file – *Pocket Money Problem*
- Spreadsheet file – *Attendance Register*

POSSIBLE TEACHING ACTIVITIES

For the first activity, explain to the children that they are going to be shown four different ways of getting pocket money over a 10 week period and that they must decide which one they would choose and why, using a spreadsheet. *Roughly, what answer do you expect from this problem?*

Support the children in calculating the amount of money they would be given in each of the 10 weeks using the four different options, and then ask them to add up the total amount received using each option. Although less able pupils may feel more secure using the repeated addition method, try to encourage them to use the =SUM() method as much as possible. If there is time, also let them improve the appearance of their spreadsheet, emphasising the need to choose contrasting colours and legible fonts so that the information is still clear.

What makes the information easy or difficult to interpret in the spreadsheet? Did you discover any errors in your formulae? Which option would you choose? Why? How many calculations did you need to work this out?

For the second activity, explain to the children that they are going to create a register in a spreadsheet and then use it to work out a week's attendance as a percentage. To begin, ask the children to enter =SUM formulae to work out the total attendance for each child and the class as a whole using any data that the children have entered by themselves. Next, show them how to convert this into a percentage (no. sessions attended / total no. possible sessions * 100). *Can you change the data in the register to achieve attendance percentages of 100, 95 and 80%? Why do you think a spreadsheet is helpful for working out a class' weekly attendance?* (consider: accuracy, neatness, formulae results will update automatically each week etc.)

YEAR 5 PLANNING

Expectations:

at the end of this unit

most children will:

use a spreadsheet to carry out calculations;
use the SUM and other functions with assistance;
know that a spreadsheet can be used to help solve problems;
change some of the data and discuss effects on results.

some children will not have made so much progress and will:

know that a spreadsheet can be used to help solve problems;
enter simple formulae into a spreadsheet;
change some of the data and discuss effect on results with assistance.

some children will have progressed further and will:

use a spreadsheet to carry out calculations;
use the SUM and other functions;
know that spreadsheets can be used for mathematical calculations and that recalculations with different values can be done quickly;
change some of the data and discuss effects on results.