Learn with Lucy

https://learnwithlucy.rocks

Click any of these shapes to go straight to the lesson :-)

Problem-solving lessons

- Chickens
  - Chickens (part 1)
    - Lucy shows us what she's already built
    - We outline the problem: is a chicken a good return on investment?
    - In Lucy's sheet, nothing is linked; everything is entered manually; maths is done by hand
    - Our first concept is the idea of 'defining the problem'
    - We separate Lucy's notes from her actual data
    - We introduce our first keyboard shortcut: pressing **tab** finishes what you're doing and moves you to the cell to your right
  - Chickens (part 2)
    - Neat trick: double-clicking column headers makes them just as wide as they need to be
    - Our first introduction to **types**
    - We look at how Excel stores **currency** and **dates**
    - This solves Lucy's weird issue with a number turning in to a date
    - We copy Lucy's data over and see that it keeps the formatting
    - ⌘ ` (backtick – the key above tab on a US keyboard) is a handy keyboard shortcut which **switches between all of the windows in your current application**
    - Excel shows **#####** when the column is too narrow
    - We take a quick look at the **AutoSum** button, which Lucy already knows
  - Egg log (part 1)
    - We review the 'egg log' that Lucy has created
    - Lucy tells us what she's learned about **functions**, **cell references**, and **ranges**
    - Lucy's been thinking about the **types** of data in her sheet
    - Lucy's **defined her problem**
    - She shows us the three versions she's come up with
    - We do some basic troubleshooting because her formula isn't adding up right
  - Egg log (part 2)
    - We pick our favourite from Lucy's three sheets
    - Lucy has used the **fill handle** which she also knows a little about
    - We show how the **fill handle** can help you fill dates in a column, and numbers that repeat
    - Johnny briefly shows what else the **fill handle** can do
    - We **add a new row** to the egg log…
    - …and see what's happened to Lucy's formula as a result
    - This causes us to re-arrange the sheet a little
    - This shows us how Excel often just 'looks after it' when you move things around
    - We change Lucy's formula from calculating a **range of cells** so that it looks at the **entire column**
    - We show how you can **copy/paste formulas** and have the references 'follow you' across the sheet
    - We look at the little **Paste Options helper** that appears when you paste in to a cell
    - We drag some cells using the little hand that appears when you're on a cell border (which Johnny never actually uses)
    - We learned to think in entire rows or columns of data
  - Chickens (part 3)
    - Lucy takes everything she's learned so far and revisits her original chickens sheet
    - She's avoided **hard-coding** values in her formulas
    - She's used **PRODUCT** then **SUM**
    - And **cell references to other sheets**
  - Chickens (part 4)
    - We find out when the chickens become debt-free
    - Lucy has used **TODAY** to figure out how many eggs per day since the girls arrived
    - We talk about errors and what to do when you see one
    - Lucy tells us how she's been using the **fill handle**
- Tracking our weight
  - Tracking our weight (part 1)
    - Remember, this is not medical advice 😬
    - We take a brief look at Lucy's original sheets
    - We define our two 'problems'
    - First: making a thing that we print out and stick inside the kitchen cupboard
    - Second: recording the weights that we write on that sheet and doing something with the data
  - Tracking our weight (homework)
    - Lucy gets homework, and solves it … almost! 😜
    - This demonstrates how Excel evaluates each argument, which is kinda interesting
    - **Cell Styles** lets you quickly colour cells – as an 'input' in this case
- Business Class 1: email address generator
  - Email generator (part 1)
    - We review the **project requirements** (which you'll never get, unless you write them yourself)
    - First up: **sniff around.** See what the data you got given looks like; assume that it's rubbish
    - **A**lways **B**e **T**abling!
    - **LOWER** takes a single argument and returns a lowercase string; **UPPER** is its opposite
    - We see that copy/pasting cells that contain a table reference doesn't work the same as it does with a cell reference
  - Email generator (part 2)
    - We can use the filter to quickly find things – like a name with a dash in it
    - **SUBSTITUTE** is like find/replace for Excel
    - You might be tempted to be lazy sometimes and not create a column if it feels like you don't need one: but **think of future users** of your sheet
    - ⚠️ Note that the keyboard shortcut for 'find the next blank cell' – **⌘/ctrl arrows** – might not work in a cell that has a function: the function has returned a value
    - **Hiding columns** (or rows) is a great way to get stuff you're no longer using out of the way
    - We discover a couple of rows with errors – **keep your eyes out**, don't just ignore something that doesn't look right
  - Email generator (part 3)
    - We use an **IF** again: in this case we check if the surname is blank: **[@Surname]=""**
    - If it's blank, there's no surname, so we return **FALSE**; otherwise there is, so we return **TRUE**
    - If you want to check if something **is not equal to**, use: **[@Surname]<>""**
    - We meet **Boolean logic**: why **TRUE AND TRUE is TRUE**, **FALSE OR FALSE is FALSE**, and so on
  - Email generator (part 4)
    - Almost there! We use another **IF** with a **CONCAT** to join the names together
    - We see how nice the table notation makes formulas: you can almost read them like a sentence
    - You can use your **inserting-hard-returns** skills to make a formula more readable by breaking it up
    - We add the @example.com to our existing **CONCAT**s
    - One more formula: **COUNTIF** counts how many times this range contains this value
    - We count how many times **all of the names** contain **this name**
    - With the help of the filter, this is a really easy way of finding duplicates
    - Finally, we use another IF to return an empty string **IF** the **COUNTIF returned a number >1**
- Mostly harmless
  - Mostly harmless (part 1)
    - If you see **three dots (an 'ellipsis' – …) after a menu option**, this means that **something else will appear** when you select the thing
    - So you can **generally click these items** just to see what happens next **without worrying that something will immediately change**
    - On a Mac, holding Option often changes the behaviour of a menu item. For some system options, it removes the ellipsis, meaning clicking the menu bar item will take the selected action *immediately*
    - How does Johnny know so much? He just clicks everything to see what it does!
    - **Be curious**
    - **F2** is the standard 'edit this cell' shortcut in Excel
    - **F2** on a laptop usually does something else, like change your brightness
    - So you might need to press **fn F2**
    - On a Mac, **ctrl U** also edits a cell
    - To move between worksheets in the keyboard, use **⌘/ctrl page up/down**
    - On a Mac laptop **fn arrow up/down** is the same as **page up/down**, so **⌘ fn arrow up/down** switches between worksheets
    - Similarly, **⌘/ctrl home/end** take you to the very beginning (top-left) and end (bottom-right) of your worksheet, ignoring islands
    - On a Mac laptop **fn arrow left/right** is the same as **home/end**, so **⌘ fn arrow left/right** is what you want here
    - Just hack around on your keyboard: shortcuts are worth learning!
    - **Page Layout > Themes, Colours, Fonts** is just a bit of fun
    - Say goodbye to that terrible default colour palette!
    - The trick to removing the gridlines in Excel is to **fill the background as white**
    - A trick to **flatten a sheet**: select everything and hit **Wrap Text** a couple of times
    - This is often handy when you inherit someone else's nonsense at work
    - In **Page Break Preview** mode you can **move the blue lines just by dragging them**
  - Mostly harmless (part 2)
    - If you can't open a new file, it might be because you're in edit mode in another sheet
    - Just like you can use the + operator in place of SUM, you can use the **& operator** in place of **CONCAT**
    - If you **start a cell with a single apostrophe '**, **the cell will be treated as text**
    - No functions will be evaluated; true isn't TRUE; and so on
    - You can do something similar by formatting the cell as Text, but Johnny prefers the apostrophe method as it's more explicit and robust
    - You can **re-size multiple columns at the same time** by selecting multiple columns and dragging one of their headers
    - (Or rows, of course)
    - There's a **handy status bar at the bottom of the window** which does quick maths for you — SUM is there by default, and you can right-click to select others
    - To un-hide hidden columns/rows, **select over the hidden area** then right-click and **Unhide**
    - **Don't** use the **'this row'** **[@[Column name]]** syntax if you're not actually in the table containing the row
    - Otherwise things move around and your 'this row' is a different row … weird
    - In our data filters, you can **filter by condition**: greater/less than, text contains, all sorts
    - You can use **Data > Sort** to do just that
    - You can build **complex Sort queries**, and **Reapply** them, which is really handy…
    - …but be careful! Doing a **Data > Clear** will **clear your sort** as well as your filter conditions 😅
  - Mostly harmless (part 3)
    - We're going to talk about things that live in the 'window chrome' around the main Excel grid
    - Turn off that annoying 'Gallery View' thing that Excel shows you when you open it!
    - You can **hide the ribbon if you need a bit more room**: just click the name of the ribbon item that you're already on
    - And you can **expand the Formula Bar** just by dragging the divider at the bottom
    - And **quickly expand/contract it** using the triangle at the very right
    - The 💡 **Tell me box is real handy** — just type a feature and it saves you having to find it in the ribbon
    - On a Mac, the **system menu bar Help** option lets you **search for any menu item**
    - (And by the way you can assign your own keyboard shortcut to any Mac menu item, in any application. Look that up online if you're interested.)
    - You can **customise the buttons on the very very top row** of the Excel window, which is the **Quick Access Toolbar**
    - If you want to lock some cells in place, you have a few options. First (and this is what most people usually use): **Freeze Panes**
    - It'll freeze **above and/or to the left** of the cell/row/column that you have selected
    - Alternatively, you can **Split the window** — slightly different, and this allows you to move the split around
    - You can open as many **New Windows** as you like — most useful if you want to view two worksheets from the same workbook side-by-side
    - Johnny has a little rant about window management, and Lucy tells us stories about an old colleague 😂
    - You can annotate cells a few ways: **Notes** is the old way, and it's a bit rubbish, so try not to use it
    - 💬 **Comments** is the new way, and they're much nicer
    - Excel **moved the R1C1 option** since we recorded our episode! It's now in Settings > Calculation
    - The Excel blog is pretty good, by the way. Click here to go there!
- Personal accounting
  - Personal accounting (part 1)
    - As an introduction to this learning pack, Lucy shows us some of her pre-Learn-with-Lucy sheets, and tells us how she used to manage her finances as a freelancer
  - Personal accounting (part 2)
    - Now that we've learned all of the topics that we covered in this pack, we rebuild Lucy's sheets using what we know
    - We start with a table which lists our Clients
    - You should be **thinking about how your data is separated** — Clients are separate from Projects are separate from Timesheets, and Invoices
    - The first thing we do is **validate the list of Clients** in our Projects table against the list of Clients in the previous sheet
    - It might be a good idea to **use Conditional Formatting** to check to see if we have any **duplicates** in our Clients table
    - Before we use our Clients table as a validation range, we need to do **that weird thing where you need to define a name** that you can use in Data Validation
    - If you are setting Data Validation against a table, it'd be nice to **use your validation Error Alert to tell people where the list is**, so they know what to update
    - We have a quick look at the **formatting differences between Currency and Accounting.** Johnny prefers Accounting
    - And we look at the options you have for **making a date look exactly like you want** — we put the short day of the week at the start
  - Personal accounting (part 3)
    - We set up validation on our Timesheets table against the Projects table
    - And show how **data validation errors** are shown, and have another look at **Circle Invalid Data**
    - At **Formulas > Error-checking** there's also a dialog box that will show you all of the errors on your sheet
    - In our Timesheets table, we set up a **VLOOKUP to retrieve the Client** according to the Project
    - We make it a bit neater by **wrapping this in an IFERROR** — hiding the #N/A and making it blank instead
    - By pasting in data we see the **Inconsistent Calculated Column error**
    - Adding a new row to the table shows that our custom date format doesn't apply — which is annoying. **We use the Format Painter to fix it**
    - Invoice numbers are another really obvious place to put some Conditional Formatting to highlight the duplicates
    - We use some simple maths to **calculate our invoice due date**
  - Personal accounting (part 4)
    - **SUMIF** is introduced, to **SUM** our hours **IF** the invoice matches
    - We grab your rate from the Projects table with another VLOOKUP
    - In calculating our GST (sales tax), we **name the cell rather than using an absolute cell reference**
    - Now that we've got some timesheets, we can **use SUMIF again** to **calculate the hours worked** against each project
  - Personal accounting (part 5)
    - Now that we've calculated how many hours remaining you have on each project, we can use **Conditional Formatting to highlight our high/low values**
    - A **Pivot Table is a really nice** way to show our invoices — we can group by client and project to see how much each has earned us
    - We put on a new field which is **% of Grand Total…**
    - …and put Conditional Formatting on that!
    - Our bank transactions are **imported with a Power Query**
    - We use **FIND** and **MID** to extract the 'INV000x' text from our transaction description
  - Personal accounting (part 6)
    - Now we use this extracted invoice number with **SUMIF** to figure out when we've been paid
    - One of our invoices hasn't been paid (typical!), so we **use Find to search our entire sheet** for the invoice number just to be sure
    - Finally, we put together some ad-hoc summary calculations
- Business Class 2: stocktake
  - Stocktake (part 1)
    - We intro this second Business Class, with a note that we've squeezed in to an hour something that took Johnny a couple of months – so it's as realistic as it can be, but bear that in mind!
    - The problem: Derek used to look after our company's inventory data, and it's a right mess. We review the sheet that we've inherited
    - **This is what you should do** if you inherit a sheet at work: **spend some time to understand what's in it**, then tidy it up
    - In this case we do make a copy of Derek's data with **Move or Copy,** and then we **hide it**
    - **Zoom out** and check your whole data set: predictably enough, **we have a blank row**
    - Derek's formats are a mess, so we just select the whole sheet and **Clear Formats**
    - And then of course we **make it a table**
    - The **model description that we inherited is hard-coded;** but we have a model code lookup table, so **let's make this a VLOOKUP**
    - Our serial numbers are messy, so we use **UPPER, TRIM, and SUBSTITUTE** to tidy them up
    - These text functions have a nice **side-effect: they convert numbers to strings,** which is what we want here
  - Stocktake (part 2)
    - We **bring the model description from the models table with a VLOOKUP,** so we can compare to Derek's original values
    - Comparing values can be fraught with danger: **the '=' operator doesn't match numbers stored as strings with the same number stored as a number**
    - There are ways to 'force a type' (computer programmer term): e.g. **TRIM always returns a string**
    - The **TYPE function** reveals the type of a cell's value
    - A **better way of comparing cells is to use the EXACT** function, which doesn't have these issues
    - This reveals some of Derek's typos, but stranger is where we have a #N/A match against the model code
    - This leads us to do a reverse-lookup of the model description, for which we use **XLOOKUP**
    - This is because **we need to look 'backwards'** in the models table, which **doesn't work with VLOOKUP**
    - And there's **no more 'comma-FALSE'** with XLOOKUP! 😅
    - This reveals a **set of common typos:** 2 has become Z; 5 has become S; 1 has become I; 0 has become O
    - We'd like to paste values the correct values over our existing values, **but we're filtered: so this won't work**
    - The trick is to **sort your data to group the items together:** now you can copy/paste
  - Stocktake (part 3)
    - Now that we've done an initial clean-up, we need to extract the data for each of our 3 remote sites
    - We use the **FILTER** function to extract all barcodes that belong to a particular city — **it returns an array,** which is funky
    - The **problem with FILTER** — and all other functions that return an array — is that **you can't make the resulting data a table**
    - (Johnny didn't know this function before this lesson, he just found it online and read the instructions)
    - Then we use **VLOOKUP to grab the serial number and description** based on the barcode
    - We use a simple list — **just entering a comma-separated list of values** — to enforce some **data validation** on our last column
    - The customised sheet for Canberra is then copied out to its own workbook using **Move or Copy > Create a copy**
    - To erase the formulas from this new sheet, we **copy the entire sheet and Paste Values**
    - Now to export for Melbourne and Hobart, we just update the name of the city and FILTER takes care of the rest for us – almost!
    - Because when you do this sort of thing you should **always jump to the bottom of your data and check** that everything has filled across all of the columns
    - ☕ Take a coffee break ☕
  - Stocktake (part 4)
    - Okay, the stocktake sheets are back from our regional sites: time to **bring them back in to our master data**
    - We do this by using **Move or Copy** again – this is a very common way of getting data between different sheets
    - Now we need to smush these tables back together: so we just copy/paste the data out, and add a new column to indicate which site the data came from
    - Conditional Formatting helps us find the 'dups' in the data (or duplicates if you insist on saying the whole word 😜)
    - And this reveals items that were found at one place and not found elsewhere: they've moved. We just delete the rows that represent the old data
    - Now we want to check our original serial number against the version sent back from the site: so we **add a new column and XLOOKUP** the new barcode
    - And then see if they match with **EXACT**
    - The errors look like typos: so we just throw away Derek's old data and use the new data that we know is good
    - But we don't want to keep that as an XLOOKUP, so we **copy/paste values**
    - Similarly we bring in the item's new location (with **VLOOKUP** this time, just for practice) and compare against our original value (**EXACT** again)
    - Finally, we want to **record an updated last seen date** for each item based on the stocktake
    - We create a new table to track each site's stocktake date, and then use **XLOOKUP** to get the date based on the city
    - A nicer version is constructed using **CONCAT,** with help from the **TEXT** function to **format the date properly**
    - **TEXT** is another one of the tricks Johnny uses to **get a long number looking just like a number** and not in scientific notation
    - 👏 Pat on the back, everybody! That's it, you made it

Concepts

- Types
  - Types (part 1)
    - What is a type and why do you care?
    - 1+2=3 but one+two doesn't =three (if you're a computer)
    - A string is just some text
    - A number is … a number! You can do maths on numbers
    - Fractions, percentages, and currency are all just numbers
    - Time and date are kinda numbers
    - Booleans are **TRUE/FALSE** values
  - Types (part 2)
    - We look at dates and show that Excel stores them as a number
    - The start of 'Excel time' is 01/01/1900, which is the number 1
    - 14/12/2021 is the 44,544th day since then
    - Autosum doesn't want to work on dates, because they're the wrong type: **SUM** wants numbers as arguments, not dates
    - Each cell has one type: you can't mix types in a cell
  - Types (bonus)
    - We talk about a real-world problem with types: the gene called 'MARCH1' that Excel turned in to a number!
- Functions & formulas
  - Functions & formulas (part 1)
    - From the beginning: what is a function, what is its structure
    - We build the **SUM** function from scratch, using the '+' operator to start
    - Function arguments (or parameters) are a particular type; the return values are also a type
  - Functions & formulas (part 2)
    - We build our own function: **MAKENICECUPOFTEA**
    - How Excel shows the function definition, tells you what arguments are required, and shows you which argument you're 'in' as you type the function
    - We build a basic 'address label printer' using **TEXTJOIN**
- Cell referencing
  - Cell referencing (part 1)
    - How we get values from somewhere else in our sheet
    - Why we don't 'hard code' values
    - The simplest cell reference: **B2, C2**
    - Duplicating your formula by copy-pasting: by default, copy-paste pastes the formula
    - …but it changes it so that your cell references change if you've gone down a row
    - Using a range: **D2:D5**
    - Using two ranges as arguments: **SUM(A1:B2, D7:E8)**
  - Cell referencing (part 2)
    - Referencing a cell in another sheet
    - **sheetname!A1**
    - **'sheet name'!A1**
    - Works just fine with a range: **'other sheet'!B2:E4**
    - If you insert or move things, Excel usually just takes care of updating cell references
    - We take a brief look at **TODAY**
    - When you change a value, anywhere else that references it updates immediately
  - Clarifying the difference between a function and a formula
    - Each cell has one formula
    - That formula starts with an **=**
    - A formula can be made up of functions (but it can also just be a cell reference)
    - Excel has 471 functions
    - **SUM** and **TEXTJOIN** are functions
- Layout and printing
  - Layout and printing (part 1)
    - We look at the three mystery layout buttons at the bottom right
    - **Page Layout** view shows you a view that looks like pieces of paper
    - Johnny warns us that Excel is not MS Publisher! Don't create your Christmas family newsletter with it
    - We look at the **Page Layout** section of the ribbon
      - **Page margins**
      - Page orientation: **portrait** vs. **landscape**
      - **Paper size**
      - **Set Print Area**
    - **Page Break Preview** layout looks like a normal Excel sheet, but it only shows you what will print, and shows you the page breaks with dotted blue lines
    - We talk about the common problem where people press **Print** and end up with 4 sheets of paper with almost nothing on them
    - **Set Print Area** tells Excel to only print the specific part of the sheet that you select
  - Layout and printing (part 2)
    - We quickly look at some other buttons that Johnny scoffs at and tells you not to use
    - **Print > Gridlines** turns on the gridlines when you print a sheet (which is off by default)
    - **Print > Selection** is a quick way to just print a selection of your sheet; it's like **Set Print Area**, but different
    - **Print > Scale to fit** lets you jam a bit more on to a sheet of paper than would normally fit
- The fill handle
  - The fill handle (part 1)
    - It does numbers!
    - It does dates!
    - Don't forget the little **Auto Fill helper** button that appears: especially useful with things like dates, where you can select 'weekdays' and so on
    - You can use it to **Copy Cells** if that's what you want
    - And you can choose to **Fill without Formatting**, or **Fill Formatting Only**
    - Double-clicking the fill handle is the quickest way to do it, but it needs adjacent data so it knows when to stop
    - We show the **⌘/ctrl A Select All** behaviour, and talk about 'islands' of data 🏝
    - It does formulas!
    - You can select multiple columns and use the fill handle to fill them all at the same time
    - Don't forget that the handle works in every direction, you don't have to go down
  - The fill handle (part 2)
    - We show the **Flash-fill** feature (which Johnny never remembers to use)
    - ⚠️ Don't forget that flash-filled data is **hard-coded**: it doesn't update when the original data updates! ⚠️
    - You can define your own **Custom Lists**: so we define the names of our chickens
    - You can **import your own Custom Lists** from existing Excel cells
    - Or you can just copy/paste in to the custom list window which is simpler and less error-prone
- Borders and simple formatting
  - Borders and simple formatting (part 1)
    - We explore Lucy's hatred of the "stupid formatting pencil"
    - The **Clear** button allows you to **Clear All** or **Clear Formats**
    - The **Format Cells** window makes its first appearance; we spend a while messing about in the **Border** tab
    - Adding new rows to an already-bordered table can be a bit of a faff: there isn't really a nice solution
    - There's a helper that appears when we **insert row**, but it doesn't help in this instance
    - Be careful when you use the **Fill Handle**: by default, it fills formatting, which often breaks the lower border
    - Top tip: try to resist doing your formatting until the very end!
  - Borders and simple formatting (part 2)
    - You can **select the entire sheet** using the select-all triangle at the top left
    - You can **drag column dividers to resize them**, but if you want an exact width it's much easier to use **Column Width** by **right-clicking on the column header**
    - (And all of this applies exactly the same to rows)
    - If you want a 'quick 'n dirty' view of what will fit on a page when you print, launching **Print Preview** will put **dotted lines** on your sheet
    - You can **copy/paste entire columns**, which includes the column widths and all cell formatting
    - You can **Repeat an action** just like you can Undo an action – **⌘/ctrl Y** is the shortcut
    - (This is really handy for things like inserting a row. Insert one row then hit **⌘ Y** to do a few more.)
    - ((Although if you select 4 rows first, then right-click and Insert, you'll get 4 more rows…))
    - The **Format Painter** is copy/paste for formatting
    - Double-clicking the Format Painter makes it 'stick'
    - We meet the **marching ants** that appear when you're in Excel's special 'copy mode'
  - Borders and simple formatting (part 3)
    - Row height: **selecting multiple rows** will show the same row height **if the rows are the same height**; otherwise it'll show you a blank value
    - **⌘** (Mac) or **ctrl** (Windows) is a near-universal keyboard shortcut that will allow you to **select a bunch of non-adjacent stuff**
    - We select two non-adjacent columns and make them both the same width
    - You can **vertically align** the content in your cells using the **Alignment** tab in **Format Cells**, or using the button on the toolbar
    - You can also **Indent** content within a cell
    - And **Wrap Text** within a cell
    - And **Merge** cells
    - But watch out, you can get yourself in a pickle if you mess about with the grid structure too much
    - If you need a **hard line break within a cell**, press **⌥ return** (Mac) or **alt return** (Windows)
    - You can **align your text in other fancy ways**: vertically, at a 45° angle, etc.
- Tables
  - Tables (part 1)
    - Lucy shares a revelation 🐱
    - To **jump to the edges** of your data use the keyboard shortcut **⌘/ctrl arrow**
    - **Holding Shift** at the same time **selects cells**
    - To 'start again' you can copy/paste data but paste the **values only** using **Paste Special**
    - We turn our **unstructured** weight data in to a **structured Table**
    - **A**lways **B**e **T**abling!
  - Tables (part 2)
    - You can **change the colour** of the table and whether it has **Banded Rows** and so on in the Table section of the ribbon
    - You can turn on a **Total Row** which can show a **COUNT**, **SUM**, **AVERAGE**, and a bunch of other stuff
    - Your **headers always show**, even if they've scrolled off the top of the window – as long as your cursor is in your table
    - You can **Insert Rows** in a whole bunch of ways and the table will just handle it for you
    - Tables come with **Filters**
    - The Filter is a really nice way of getting a view of all of your data: **it only shows each value once**
    - You can **multi-filter** on a bunch of columns
    - You can **Filter** anything – the buttons are in the **Data ribbon**
  - Tables (part 3)
    - We use **CONCAT** to add "kg" to Johnny's weight
    - Excel **automatically expands the table** for us
    - And a table automatically fills a formula down the entire **Calculated Column** for us
    - CONCAT does exactly what we ask it to, including adding "kg" to a bunch of things that aren't numbers
    - So we use **ISNUMBER** to figure out what's a number
    - The Filter is also a really nice way of **checking that your functions did what you expected**
  - Tables (part 4)
    - It gets real with our first **IF**
    - We use IF to only add "kg" to Johnny's weight **if it is a number**
    - We **nest a function**, using CONCAT as an argument to IF
    - Then we also bring our ISNUMBER in, **nesting it as the logical_test of our IF**
    - A common pattern is 'if some condition, do a thing; **otherwise just return what was there**'
    - Johnny discovers that the **arrows behave differently in the Formula Bar** than they do when you're editing directly in a cell
    - This can help you build your formulas as it's clearer when you have closed all of your brackets
  - Tables (part 5)
    - We learn why referencing a whole column, say **C:C**, can lead to problems later
    - We learn the **new cell referencing notation** for tables
    - It's a lot nicer than C:C because it's self-descriptive
    - And you can 'reach in' to your data more easily from elsewhere in your workbook
    - Don't forget to use **tab completion** to help you select what you want – it's more reliable than typing it yourself
    - You can – and should always – **give your tables custom names** (vs. "Table1" which you get by default)
    - Johnny uses the 'it's a variable' convention of giving table names **lowercase_names_joined_with_underscores**
    - General rule: name your things properly so that you can remember what they are! Sounds obvious, but…
  - Tables (part 6)
    - If you want to reference **this row** in a table, use the **[@[Column name]]** syntax
    - If you're referencing a table from within the table, you don't need the table name
    - (And if you type it, Excel will remove it from the formula)
    - We look at common missing-a-bracket mistakes: there's no real solution, you just need to be careful
    - We have a quick look at **MIN** and **MAX**
    - And round out tables by showing how we solved the 'weird data in column C' issue…
    - …and the 'having to expand your formula when you add a new row' issue, both of which tables just handles for us 🎈
- Charts
  - Charts (part 1)
    - Johnny confesses that he's not very good at charts — but luckily it's got a lot better since Lucy last tried it in 2001
    - With an abridged version of our weight data, we use **Recommended Charts** to insert a new chart
    - Our recommendation is to lean heavily on Excel here: let it do the work for you, try not to customise too heavily
    - The **Chart Design** ribbon is really visual: click around and see what you get
    - To un-table a table, click **Convert to Range** on the **Table** ribbon…
    - …but your chart data should be a table if at all possible, otherwise your chart might not update with your data
    - The **Quick Layout** button is 'rad' — Lucy
    - If you want to get really specific about what's on your chart, use the **Add Chart Element** button
    - You can use the same button to **remove chart elements**
    - To **select specific chart components**, use the **drop-down menu** on the **Format** ribbon
    - Johnny tends not to click on the chart — it's a bit fussy and easy to get wrong
    - To format the thing you've selected, activate the **Format Pane** from the **Format** ribbon
  - Charts (part 2)
    - You can move a chart to its own sheet using **Move Chart**
    - If you do want to update the chart's data source, use **Select Data** — but be careful, you have to know what you're doing here
    - We look at how **blank cells**, or cells with a **non-numeric value**, or cells with the Excel error **#N/A**, are handled
    - You can **choose how the graph displays empty cells** using the drop-down in Select Data
    - We make a breakfast pie chart 🥓🍳☕
    - **Selecting a single data point** — vs. a data series — is a bit finicky, and can only be done with the mouse
    - We **add a trendline** to our weight data
    - Don't forget you can just play around with charts: if in doubt, undo!
- Errors (Don't panic)
  - Don't panic (part 1)
    - We change the **green triangle of mystery** to be … pink
    - **#VALUE!**
      - Usually some sort of **type error**
      - You'll see this if you pass the wrong type of arguments to a function
      - There's an error helper but we're not sure it's all that helpful
    - **#N/A**
      - The 'softest' of the errors
      - Excel will handle #N/A gracefully; trying to do maths on it just gives you another #N/A
      - Common lookup functions (we'll see VLOOKUP later) return #N/A if the **thing you were looking for wasn't found**
      - The function **NA** returns the value **#N/A**
      - We compare #N/A to just leaving a cell blank or returning the empty string
    - **#NAME?**
      - **A function or a reference isn't recognised**
      - Probably a typo! Check your work
  - Don't panic (part 2)
    - **#REF!**
      - An **invalid reference**
      - Excel doesn't know where to go
      - We create a **namespace conflict** by calling a table 'concat' … which Johnny thinks is really dumb
    - **#DIV/0!**
      - You **can't divide by zero** because the answer is infinity
    - **#NUM!**
      - You're trying to represent **a number which is larger than Excel can handle** … which is a ginormous number that you'll never need unless you're some sort of multiverse astronomer 🌌
      - Or **a number that it can't handle**, like the square root of -1 which is the (very cool) imaginary number
    - **#NULL!**
      - Something something you put a space instead of a comma something something 🤪
      - (Johnny has never seen this error in real life)
    - **#SPILL!**
      - You'll see this if you try to put data inside a range that Excel has reserved
      - Or other scenarios — this is another one that Johnny never runs in to in real life
    - **#CALC!**
      - Literally no idea … move along, nothing to see
  - Don't panic (part 3)
    - We introduce the concept of **trapping** or **catching an error**
    - We say that the computer **throws an error**; you can throw an error yourself if you want
    - **ISERROR** returns **TRUE** if its argument evaluates to an error
    - You typically use this with an IF to catch and deal with an error
    - **ISERR** does the same, but it doesn't treat the 'soft error' #N/A as an error
    - **IFERROR** is an **error handler function**: if the first argument *isn't* an error, it just returns it; if it *is*, it returns the second argument
    - We look at filtering errors using the data filter: they're grouped together at the bottom
- Importing data
  - Importing data (part 1)
    - We talk about **importing data**, and keeping the connection to the data, is fundamentally different from copy/pasting that data
    - A very common format is the **comma-separated values** file: a **.csv**
    - If you just double-click a .csv file, it'll open in Excel
    - (Unless you have Apple's Numbers program, which might have taken the default. You can change that if you want.)
    - You can open a .csv in any program, because **actually it's just text**
    - **Be careful with** .csv files: **a stray comma** will put everything out of whack!
    - And **be careful** not to use Excel features and then save the .csv: **it isn't an Excel file**, and the **fancy stuff will disappear**
    - And **be careful saving** as an Excel file: make sure it's the **new .xlsx and not the old 'Excel 97-2004' .xls**
  - Importing data (part 2)
    - **Data > Get Data (Power Query)** to import data
    - This is the new way, which you should prefer: we show you the old way in a bit
    - Excel looks at your data and tries to **figure out your types**
    - Once you've made a connection to an external data source, right-clicking on your table gives you a **Refresh** option
    - Excel names the table it creates based on the name of the file you imported from
    - 🚨 We feel like we're nagging, but guess what: **be careful!** When you **refresh your data, it'll overwrite** whatever you have in your table, **including any changes you made**
    - Also **if rows are added or deleted from your source data**, it'll cause any hard-coded data in your Excel table to **become misaligned**
    - **Always Be Checking!** You just have to be diligent and check your own data
    - When you **reopen a file** with an external data connection, **Excel will warn you** and **stop the connection from refreshing** until you say it's okay
    - We have a look at the options in **Data > Properties**
    - You can **Refresh data when opening the file**, which is useful
    - And **Remove external data from worksheet before saving**
    - There's also **Data > Queries & Connections**
    - This shows your connections; if you select one, you can **Remove** it to break the connection
  - Importing data (part 3)
    - You can use **Paste Special** to import comma-separated data that's **on your clipboard**
    - You can also **Use Text Import Wizard…** which is the 'old way' — this also works with clipboard data
    - Of course, importing data from your clipboard doesn't keep any connection to wherever you got your data from
    - We look at the 'old way' in more detail: **Get Data > From Text (Legacy)** launches the wizard 🧙
    - The **properties of the connection** when you make it the old way **are different**
    - By default, **Prompt for file name on refresh** is turned on — you probably want to turn it off
    - The main issue with the old way: **you can't use a table** while also retaining the connection to your data 😞
    - We close by reminding you that you should **Always Be Checking:** don't just right-click, hit Refresh, and go to lunch
- Advanced cell referencing
  - Advanced cell referencing (part 1)
    - We're back in the world of A1-style cell references, vs. table style
    - We show **the problem with relative referencing**: when you fill down, it often goes wrong
    - This is because the relative range 'follows you' down the sheet as you fill
    - For a 'behind the scenes' **look at the formulas rather than the results, hit ctrl `**
    - **By default**, Excel treats all references as **relative**, which is usually what we want
  - Advanced cell referencing (part 2)
    - **R1C1 reference style** is actually what Excel uses 'under the hood'
    - **R = row, C = column**
    - (Notice they're flipped from the A1 way, which indicates column then row.)
    - Square brackets are a relative reference
    - **R[1]**C is **one row down**, this column
    - **R[-1]**C is **one row up**, this column
    - R**C[1]** is this row, **one column to the right**
    - R**C[-1]** is this row, **one column to the left**
    - We bump in to the **green triangle of mystery** again, when it warns us about an **inconsistent formula**
    - In **R1C1 mode**, when we copy/paste or fill a formula, **it's the same formula!**
    - To specify an **absolute reference** in R1C1 mode, **don't use the [square brackets]**
    - **R2C3 = row 2, column 3** (which is cell C2 in our usual style)
    - **R16 = row 16**, all of it
    - **C9 = column 9**, all of it
    - An **absolute reference never changes**, no matter where you copy it
    - And finally we discover **what the $ means**: it's how we indicate **an absolute reference in A1 style**
    - So **B6** means column B, row 6, and **that'll never change**
  - Advanced cell referencing (part 3)
    - We look at a **COUNTIF** example, locking different parts depending on what we want to do
    - There's no rule that can tell you what to lock (if anything): it all **depends on your data** and what you're trying to achieve
    - We construct an example 'calendar' using CONCAT
    - And another COUNTIF
    - This lesson is hard to summarise in words! 😜
- VLOOKUP
  - VLOOKUP (part 1)
    - We note that **VLOOKUP is a historical function**: the 'V' stands for vertical
    - There's also **HLOOKUP for horizontal lookups** (which is much less common)
    - **XLOOKUP is the new function**, you should check it out
    - VLOOKUP allows you to reach in to a table of values and return one of the columns associated with the value that you specified
    - The crucial limitation is that **the first column of the table** you specify **must contain your lookup value**
    - The **last argument** to VLOOKUP should **almost always be FALSE**: don't forget it, because if you do the default is TRUE!
    - If your **lookup value isn't found, #N/A** is returned
    - Be careful when specifying your **lookup range**: you probably want some sort of **absolute reference**
    - The **third argument**, a number, specifies **which column to return**: counting from 1, which is the first column containing the value you looked up
    - You *might* also want to lock the column component of your lookup value; this allows you to fill your formula across
    - Using **a table as your lookup target** is especially nice: just use its name (assuming that your lookup value is in its first column)
  - VLOOKUP (part 2)
    - We show how you can **nest a formula** — CONCAT in this case — **as the first argument**; so we're VLOOKUPing the result of the CONCAT
    - A common pattern is to **lookup the result of a previous lookup**: we show this with users, apps, servers, and locations
    - If you **leave the last argument blank, or specify TRUE,** you get an **approximate match**
    - This is handy when you're **looking up** things like **numbers** in a table where the exact number you're looking for isn't there
    - But **be careful!** If you use this with a lookup value that isn't a number, you'll probably get **unpredictable results**
    - We use this to match our transactions using a 'lookup table'
    - We use **FIND, MID,** and **TRIM**
- Pivot Tables
  - Pivot Tables (part 1)
    - We insert a pivot table using, no surprise, **Insert > Pivot Table**
    - Just like when you create a table, you get an option for **where you want to put it**
    - And just like a table, **you can move it later…**
    - …and you should **give it a decent name**
    - To **build your table**, you **drag fields** in the **PivotTable Fields** section on the right side of the screen
    - You can drag **multiple fields** in to each section if you want
    - The whole thing is very visual: just drag things around
    - If you **double-click on any value** in a pivot table, Excel will extract the values that make up that cell; it'll put them in a new table on a new sheet for you
    - **Be careful** because this data **isn't linked** to the original: it's a point-in-time extract
    - We check out the **Pivot Table Options**
    - **Active Field** tells you **which field your cursor is in** … and you can type in it, which we don't understand, so just don't do that 😂
    - But it's handy to know where you are before you click **Field Settings,** which is where you can **change the number formatting**
    - This is also where you can change the way Excel is **summarising your values:** typically you want **SUM** or **COUNT**
  - Pivot Tables (part 2)
    - If you add/remove rows from your source data, **you need to manually Refresh** your pivot table
    - The **Slicer** and **Timeline** are cool
    - We have a look at the options on the **Design** ribbon
    - Our house inventory data is really interesting in a pivot table — we'll make the data available, play with it!
    - **GETPIVOTDATA** is a handy function
    - But be careful because if the 'shape' of the pivot table changes, **you might end up with a #REF! error**
- Conditional Formatting
  - Conditional Formatting (part 1)
    - You can use conditional formatting to **automatically highlight cells** that are **greater than, less than, between, or equal to a value**
    - There's a few ways to do it: the first way we look at we **apply it to a single cell** then use the **Fill Handle** to **Fill Formatting Only**
    - You could also **copy/paste formatting**, or you could use the **Format Painter**
    - Or **select all of your data first** and *then* apply your conditional formatting
    - Or use the **Applies to** range in **Manage Rules**
    - They all end up with the same result
    - Conditional formatting overrides any standard formatting, if they conflict
    - We have a look at the **Manage Rules** dialog where all of your rules are shown
    - Unfortunately **you can't use table notation** here: if you try, it just reverts to A1 style referencing
    - You can also highlight a cell that **contains a text string**
    - There's all sorts of other stuff: **data bars, colour scales, icon sets** — have a play and see what you can do, it's all really visual
    - If the rule is created with an automatic minimum/maximum you can override it and specify values yourself; Johnny does this with things like percentage complete values at work, where 0% is red and 100% is green
  - Conditional Formatting (part 2)
    - You can **use a formula** to conditionally format cells: **if it returns TRUE**, the formatting will apply
    - It's a bit of a faff: click **Conditional Formatting > New Rule… > Style: Classic > Use a formula to determine which cells to format** 😢
    - When you do this, **watch your relative vs. absolute cell references:** if you make them absolute, they won't fill down your sheet
    - Careful **when you copy/paste cells** that have conditional formatting applied: **the rule will also be copied**, and you can end up in a right mess
    - Probably **the nicest way to extend a formatting rule** — should have mentioned this at the start! — is to **use the Applies to range** in the **Manage Rules** dialog
    - There's a rule to **highlight Duplicate Values** which is really handy
    - And you can use the filtering that we've already looked at to **filter on a colour**
    - We look at the **shortcut way to arrive at a Boolean**: rather than using IF, just **evaluate the statement directly**
    - So **=A1>25** will return **TRUE** if the value in A1 is greater than 25
    - And **=A1="Personal"** will return **TRUE** if A1's value is 'Personal'
    - And both will return **FALSE** otherwise
    - Conditional formatting **rules are applied in an order**, and you can **move them above or below each other** with the arrows in **Manage Rules**
    - You can use **=TRUE** to create a **'default' rule** that will always apply
- Naming cells
  - Naming cells (part 1)
    - A nice little trick: **you can give any cell (or range) a name**
    - If you find yourself using an **absolute cell reference** (A1) you should think, **can I name this cell?**
    - You can just **type a name** up in the **Name Box** (to the left of the Formula Bar)
    - You can **use the Name Box to jump to anything that has a name** — tables, ranges, whatever
    - You manage your names in **Formulas > Name Manager**
    - You can also create a name using **Formulas > Define Name,** and this allows you to **limit the scope of your name** to just the worksheet you're on (but don't bother unless you have a really good reason)
    - *Anoooother* warning from Johnny to not get carried away with this feature: don't create problems for other people at work
- Validating data
  - Validating data (part 1)
    - You can limit what can be entered in a cell: click **Data > Data Validation**
    - And you can put custom messages on a box to tell people what sort of values you need to enter
    - You can limit based on the actual **number in the cell**, based on **how many characters** are in the cell, or you can specify that the cell has to contain **a date, or time**
    - Or you can limit the contents of a cell to **any list of things that you specify**
    - You can just specify a range, but this won't expand as you add items to it
    - And unfortunately **you can't use table notation** to specify a table column
    - The hacky workaround — which we recommend — is to **define a name** which **points to a table range**, then **use this name** as your list
    - But follow the Excel blog! Because Johnny expects one day to be able to use table notation here
    - Keyboard shortcut! **Option/alt down arrow** will show you the list of possibilities, then you can use the arrows to select
    - Using validation can help with **data hygiene**
    - If you want to define a quick 'n dirty list, you can **just type a comma-separated list of values** directly in to the box
- Find & Replace
  - Find & Replace (part 1)
    - There's more to Find than the 'Find file' box up at the top-right of the window
    - **ctrl F** (Mac/Windows) will bring up the **full Find & Replace dialog**
    - The **Options might be hidden** for you — click the button to reveal them
    - You can find **Within: Sheet** (the sheet you're looking at) or **Workbook** (the entire file)
    - You can **Search: By Rows** or **By Columns**, which just alters the 'direction' that Excel searches, i.e. which result it finds first — Johnny rarely changes this one
    - And the one that can cause you problems is **Look in: Formulas, Values, Notes, Comments**
    - So if you're **Looking in: Formulas**, you might not see what you're looking for. The **most common 'gotcha'** is that you need to **change this to Values**
    - (By the way, in Pivot Tables Lucy wondered if she could search someone else's sheet for the GETPIVOTDATA function. This is how you could do that.)
    - You can turn on **Match case**, which will only **return results that ExaCTly MaTCh** according to the case of the letters
    - And **Find entire cells only** which needs to match the entire cell to return a result
    - All of this works with **Replace**, just hit the **Replace tab** to activate it
    - If you have **more than one cell selected, Find will only look in the selected cells**
    - This can be a) very handy if you want to narrow down your search and b) a cause of confusion if you don't realise what you've done
    - You **can't search for the name of a worksheet**, but if you right-click the arrows at the very bottom-left of the window you'll get a pop-up window with all of your sheets listed