

TIPS, TRICKS & TIMESAVERS Using Microsoft Excel



Vermont Recreation & Parks Association
October 10, 2018



<http://www.thisisrework.com/vrpa/>

trapped in
spreadsheets

- Intro Question
 - How would you describe your relationship to Excel?
- Download tools from my website
 - <http://www.thisisrework.com/vrpa/>

Objectives

- Understand the layout of Excel
- Create & format a spreadsheet to illustrate data effectively
- Build basic formulas
- Analyze data by using pivot tables and charts

- Understand the layout of Excel
- Create & format a spreadsheet to illustrate data effectively
- Build basic formulas
- Analyze data by using pivot tables and charts

Caveat: I am not an expert, I am a practitioner. Please also share what you know!

Style of workshop is to work together as we go through different features and functions. I may get it wrong, too! That's part of the process.

PART ONE:

Introduction to Excel

A Quick History



A	B	C	D
ITEM	NO.	UNIT	COST
MUCK	4	10	55
RAKE	1	10	10
TONER	2	10	10
SNUFF	2	10	10
SUBTOTAL			13155
9.75% TAX			1282
TOTAL			14438.16

- Spreadsheet application made by Microsoft
- Other alternatives (Pages, Google Sheets, etc.)
- Spreadsheet = Bookkeeping ledger
- Invented in 1979 by Dan Bricklin and Bob Frankston
- Many different versions so we won't get into specifics, stick with core functionality



Rico
2012.
rico@rico.co.za

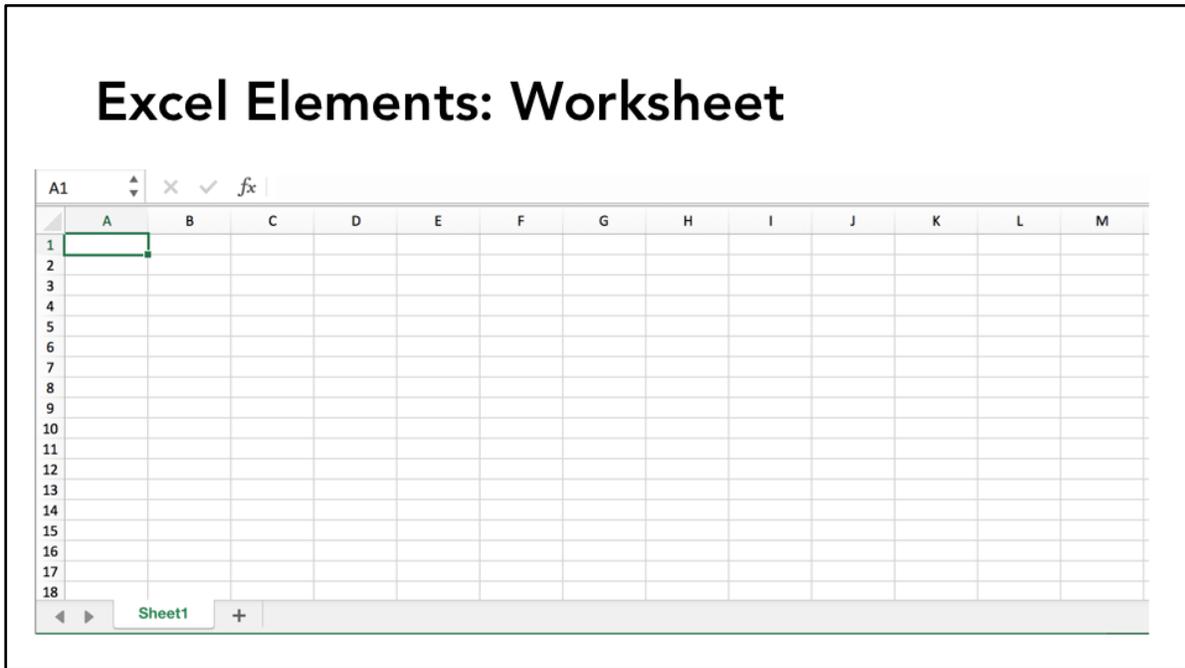
"Let's see ... faster than a speeding bullet ... strength of a thousand men ... can leap tall buildings in a single bound ... very impressive resume. How are you with Excel?"

Excel Elements: Ribbon



- Common across all Microsoft applications for consistent look and feel; shortcuts to all functionality within the application.
- HOME. The HOME tab includes commands for formatting worksheets, cells and data and commands for inserting and deleting columns and rows.
- INSERT. Use the INSERT tab to insert tables, illustrations, charts, links, sparklines, headers & footers, custom text and symbols, and more.
- PAGE LAYOUT. Use the PAGE LAYOUT tab to change your margins, change the page background, change the page orientation, and more.
- Formulas. Use the FORMULAS tab to browse and select formulas and functions, to define names, to audit formulas, and more.
- DATA. Use the DATA tab to access external data, to sort & filter, to access data tools, to group cells together, to add subtotals, and more.
- REVIEW. Use the REVIEW tab to check spelling, add comments, protect your worksheet or workbook, and more.
- VIEW. Use the VIEW tab to change your workbook view, show or hide gridlines, headings, the formula bar and the ruler, arrange windows, freeze panes, zoom in or out, and more.

Excel Elements: Worksheet



- Rows
- Columns
- Name Box
- Cancel Button
- Enter Button
- Formula Bar

Excel Elements: Cells

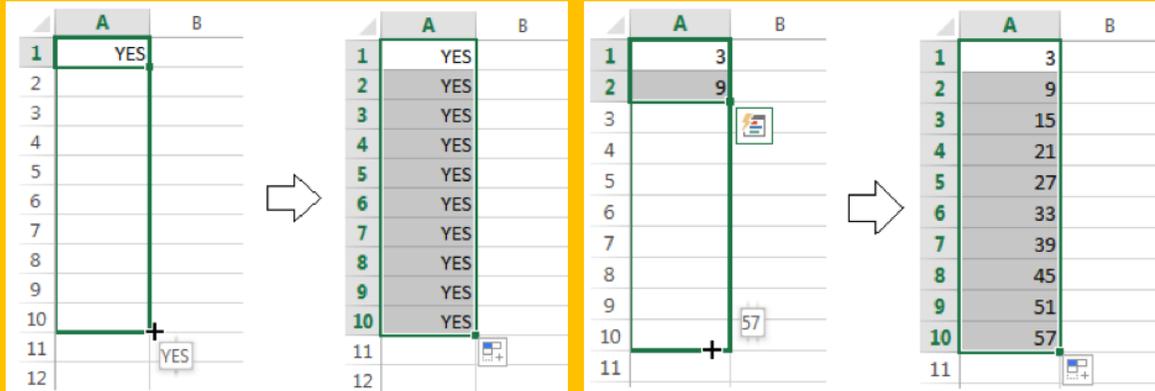
The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E
1	Text	One Million			
2	Value	\$ 100,000.00			
3	Formula	100000			
4					
5					
6					
7					
8					
9					

The formula bar at the top shows the active cell B3 with the formula $=100*1000$. The spreadsheet has columns A through E and rows 1 through 9. Cell B3 is currently selected and contains the value 100000.

- Each cell holds one piece of information which can be simple or complex
- Cells hold 3 types of information: text, value, or formula
 - Text: combination of letters, numbers, characters. Can't be used for calculations. Left justified.
 - Value: numbers, dates, times. Can be used for calculations. Right justified. Negative numbers in parentheses.
 - Formula: begins with equal sign. Expression telling Excel to perform a calculation.
 - PRO TIP: Excel guess at what kind of format you are using. If excel is wrong, enter a single quote mark.
- Each Cell has a specific reference made up of the column (letter) and row (number)
- A cell must be active if you want to enter data. The active cell has a thicker darker border
- Bottom right corner of the cell selector is marked by a small square, called the fill handle
- Change the cell size by changing the column width or row height
- Selecting groups of cells, columns or rows

PRO TIP: Autofill



Autofill: Use Autofill if you want to copy an existing logical pattern to new cells. This works for number series (1,2,3); text (Mon, Tue, Wed); dates; and formulas.

On the Intro tab, select cell A10 and drag it down. This copies down the value of A10.

Now select cells A5:A10 and do the same. It copies down the pattern rather than the value of A10.

PRACTICE: Copy the pattern in column A of the Info tab until you reach 20.

Excel Elements: Tabs

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E
1	Text	One Million			
2	Value	\$ 100,000.00			
3	Formula	100000			
4					
5					
6					
7					
8					
9					

The formula bar at the top shows the active cell B3 containing the formula $=100*1000$. The spreadsheet interface includes a 'Cells' button, a 'Sheet2' tab, and a '+' button for adding new sheets.

- Active tab is highlighted
- Tab names can be added
- Create a tab and name it Data

PRACTICE: Add a new tab in the workbook, name it “Data”, and move it to the right of the “Intro” tab.

Excel Element: Pointer

name	pointer	use to	visible over the
Normal		Select a cell or range; indicates Ready mode	Active worksheet
Fill handle		Copy cell contents to adjacent cells	Lower right corner of the active cell or range
I-beam		Edit cell contents in active cell or formula bar	Active cell in Edit mode or over the formula bar
Move		Change the location of the selected cell(s)	Perimeter of the active cell(s)
Copy		Create a duplicate of the selected cell(s)	Perimeter of the active cell(s) when [Ctrl] is pressed
Column resize		Change the width of a column	Border between column heading indicators

- Arrow: Select item from Ribbon, scrolling, other commands
- I-Beam: Type text
- White Plus Sign: Moving over surface of worksheet
- Black Plus Sign: Extend or fill from selected cell
- Black Arrow: Select column or row
- Pointing Hand: Hyperlink
- Double Arrow Cross: Change column width or row height

PRO TIP: Paste Special

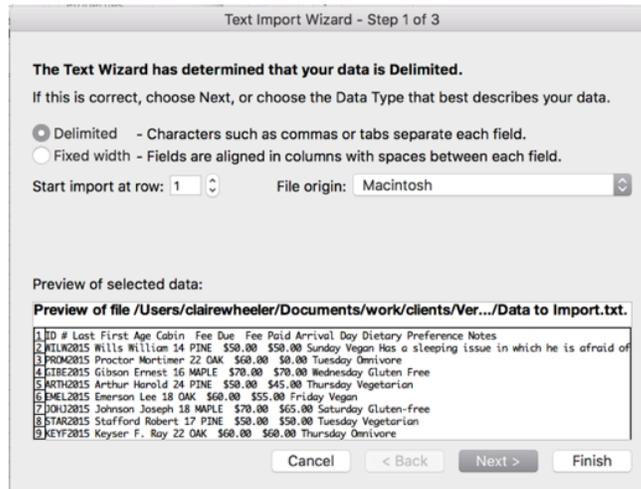
The image shows a screenshot of the 'Paste Special' dialog box in Microsoft Excel. The dialog box is titled 'Paste Special' and contains several sections of options:

- Paste:** A group of radio buttons for selecting what to paste:
 - All
 - Formulas
 - Values
 - Formats
 - Comments
 - Validation
 - All using Source theme
 - All except borders
 - Column widths
 - Formula and number formats
 - Values and number formats
 - All, merge conditional formats
- Operation:** A group of radio buttons for selecting the operation to perform:
 - None
 - Add
 - Subtract
 - Multiply
 - Divide
- Other options:** Two checkboxes:
 - Skip Blanks
 - Transpose
- Buttons:** Three buttons at the bottom: 'Paste Link', 'Cancel', and 'OK'.

PART TWO:

Formatting

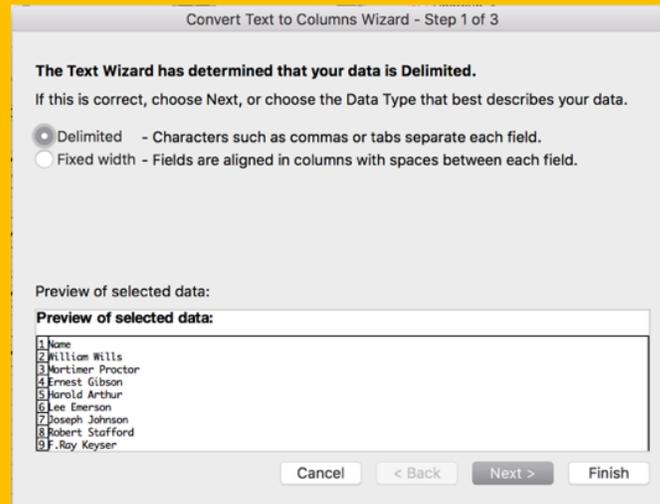
Creating a Spreadsheet



- To build a spreadsheet, you'll probably do a mix of writing new content and copying/pasting existing data.
- From the Data tab in the Ribbon or from File → Import, import the Data files you downloaded
- Use the Text Import Wizard to import the data to cell A1 of the Data tab

PRACTICE: Import Data into the Data tab of the spreadsheet.

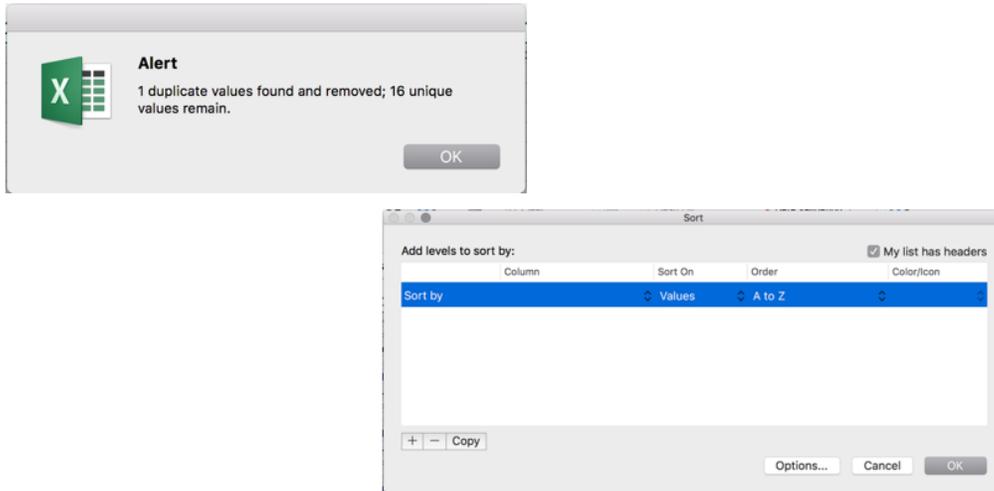
PRO TIP: Text to Columns



- Text to columns allows you to separate the content of one Excel cell into separate columns.
- This will come in handy when you copy and paste information from an email or another source into a spreadsheet, or if you're pulling it from an existing Excel workbook that doesn't have the columns separated.
- In this instance, we want to separate first from last names
- Insert a column next to Column A
- From Data Ribbon or drop down menu, select Text to Columns and follow the prompt

PRACTICE: Split Name in column A into two separate columns for First Name (column A) and Last Name (column B). Don't forget to update the header row.

Basic Formatting: Clean & Sort Data



Highlight the entire data set.

Hit the "Data" tab.

Click the "Remove Duplicates" button.

Select what columns you want Excel to find duplicates in.

Hit "OK."

PRACTICE: Remove any duplicates from the table.

Basic Formatting: Add, Delete and Resize Columns/Rows

ID #	Last	First	Age	Cabin	Fee Due	Fee Paid	Arrival Day	Diet
WILW2015	Wills	William	14	PINE	\$50.00	\$50.00	Sunday	Veget
PROK2015	Proctor	Mortimer	22	OAK	\$50.00	\$0.00	Tuesday	Omn
GIBB2015	Gibson	Ernest	16	MAPLE	\$70.00	\$70.00	Wednesday	Glut
ARTH2015	Arthur	Harold	24	PINE	\$50.00	\$45.00	Thursday	Veget
EMEL2015	Emerson	Lee	18	OAK	\$60.00	\$55.00	Friday	Veget
JOH12015	Johnson	Joseph	18	MAPLE	\$70.00	\$65.00	Saturday	Glut
STAR2015	Stafford	Robert	17	PINE	\$50.00	\$50.00	Tuesday	Veget
KEYF2015	Keyser	F. Ray	22	OAK	\$60.00	\$60.00	Thursday	Omn
HOFF2015	Hoff	Philip	20	MAPLE	\$70.00	\$70.00	Friday	Veget
DAVD2015	Davis	Deane	21	PINE	\$50.00	\$0.00	Saturday	Veget
SALT2015	Salmon	Thomas	15	OAK	\$60.00	\$0.00	Tuesday	Nut
SNER2015	Snelling	Richard	15	MAPLE	\$70.00	\$0.00	Thursday	Omn
KUNK2015	Kunin	Madeleine	17	PINE	\$50.00	\$30.00	Friday	Glut
SNER2015	Snelling	Richard	22	OAK	\$60.00	\$40.00	Saturday	Omn
DEAH2015	Dean	Howard	18	MAPLE	\$70.00	\$60.00	Tuesday	Veget
SHUP2015	Shumin	Peter	18	PINE	\$50.00	\$50.00	Thursday	Nut

- Click edge of column or row line to drag
- Double click on edge of line to trim columns or rows
- Select all and right click to apply standard size
- To add more than one, select as many rows or columns as you'd like to add and then Right Click and add.

PRACTICE: Make the imported data look like a table with header row & filter.

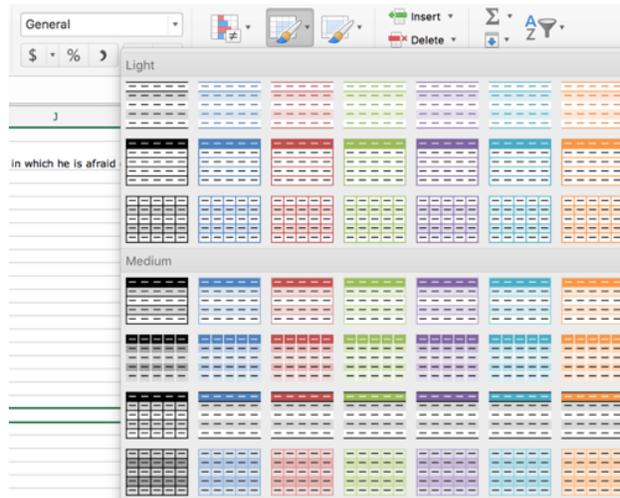
Basic Formatting: Wrap & Merge Text

	A	B	C	D	E	F	G	H	I	J
1	ID #	Last	First	Age	Cabin	Fee Due	Fee Paid	Arrival Day	Dietary Preference	Notes
2	WILW2015	Wills	William	14	PINE	\$50.00	\$50.00	Sunday	Vegan	
3	PROM2015	Proctor	Mortimer	22	OAK	\$60.00	\$0.00	Tuesday	Omnivore	
4	GIBE2015	Gibson	Ernest	16	MAPLE	\$70.00	\$70.00	Wednesday	Gluten Free	
5	ARTH2015	Arthur	Harold	24	PINE	\$50.00	\$45.00	Thursday	Vegetarian	
6	EMEL2015	Emerson	Lee	18	OAK	\$60.00	\$55.00	Friday	Vegan	
7	JOHJ2015	Johnson	Joseph	18	MAPLE	\$70.00	\$65.00	Saturday	Gluten-free	Has a sleeping issue in which he is afraid of the dark and wakes up often. His teddy bear helps with this.
8	STAR2015	Stafford	Robert	17	PINE	\$50.00	\$50.00	Tuesday	Vegetarian	
9	KEYF2015	Keyser	F. Ray	22	OAK	\$60.00	\$60.00	Thursday	Omnivore	
10	HOFP2015	Hoff	Phillip	20	MAPLE	\$70.00	\$70.00	Friday	Vegetarian	
11	DAVD2015	Davis	Deane	21	PINE	\$50.00	\$0.00	Saturday	Vegan	
12	SALT2015	Salmon	Thomas	15	OAK	\$60.00	\$0.00	Tuesday	Nut Free	
13	SNER2015	Snelling	Richard	15	MAPLE	\$70.00	\$0.00	Thursday	Omnivore	
14	KUNM2015	Kunin	Madeleine	17	PINE	\$50.00	\$20.00	Friday	Gluten Free	
15	SNER2015	Snelling	Richard	22	OAK	\$60.00	\$40.00	Saturday	Omnivore	
16	DEAH2015	Dean	Howard	18	MAPLE	\$70.00	\$60.00	Tuesday	Vegetarian	
17	SHUP2015	Shumlin	Peter	18	PINE	\$50.00	\$50.00	Thursday	Nut Free	

- By default, text will stay in the size of the row and spill into the next column
- To avoid this, use the Text Wrap Feature
- Merge
- Left / Right / Center Justification

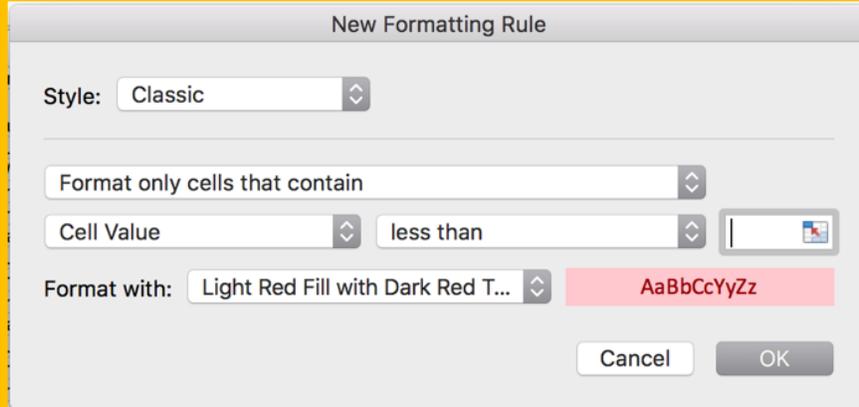
PRACTICE: Resize the column with Notes data to a column width of 30 and wrap the text in that column.

Basic Formatting: Format as Table



- Bold the Header Row
- Select Table format from Home Menu
- Add an Auto Filter by going to Data > Filter
- Autofilter allows you to add a filtered drop-down menu to any column of information. This is great for finding information quickly.
- Advanced Filter lets you do a bit more using more complex criteria. One Awesome Thing you can do with Advanced Filter is get a list of only the unique records in a data set that has a bunch of repeated data.
- Sort Data

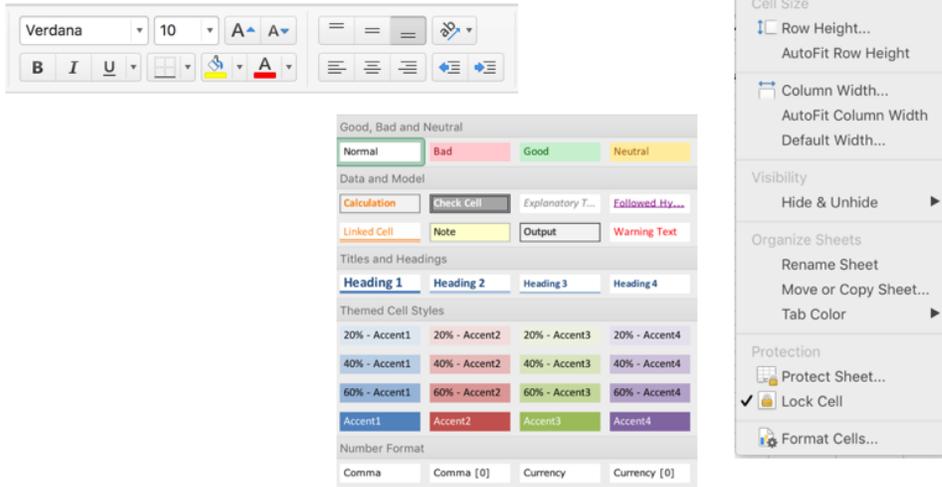
PRO TIP: Conditional Formatting



- Conditional Formatting applies a rule for data meeting certain criteria to appear differently.
- For example, you could have any cell in a spreadsheet that is negative appear as red, and any positive number appear in green.
- In our example, let's use it to identify which of our campers are under the age of 18.
- Select column C
- From Home Ribbon or Format menu, select Conditional Formatting
- Format cells that only contain cell value less than 18

PRACTICE: Turn Age data red in column C for all ages under 18.

Basic Formatting: Font, Shading, Alignment



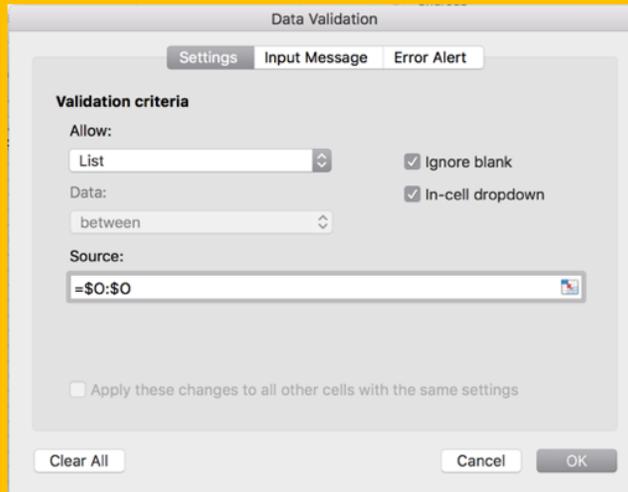
- Choose font and font color of your choice
- Use Cell Styles menu
- Use Format Menu

Basic Formatting: Gridlines & Borders

	A	B	C	D	E	F	G	H	I
1	Last	First	Age	Cabin	Fee Due	Fee Paid	Arrival Day	Dietary Preference	Notes
2	Wills	William	14	PINE	50	50	Sunday	Vegan	Has a sleeping issue in which he is afraid of the dark and wakes up often. His teddy bear helps with this.
3	Proctor	Mortimer	22	OAK	60	0	Tuesday	Omnivore	
4	Gibson	Ernest	16	MAPLE	70	70	Wednesday	Gluten Free	
5	Arthur	Harold	24	PINE	50	45	Thursday	Vegetarian	
6	Emerson	Lee	18	OAK	60	55	Friday	Vegan	
7	Johnson	Joseph	18	MAPLE	70	65	Saturday	Gluten-free	
8	Stafford	Robert	17	PINE	50	50	Tuesday	Vegetarian	
9	Keyser	F. Ray	22	OAK	60	60	Thursday	Omnivore	
10	Hoff	Philip	20	MAPLE	70	70	Friday	Vegetarian	
11	Davis	Deane	21	PINE	50	0	Saturday	Vegan	
12	Salmon	Thomas	15	OAK	60	0	Tuesday	Nut Free	
13	Snelling	Richard	15	MAPLE	70	0	Thursday	Omnivore	
14	Kunin	Madeleine	17	PINE	50	20	Friday	Gluten Free	
15	Snelling	Richard	22	OAK	60	40	Saturday	Omnivore	
16	Dean	Howard	18	MAPLE	70	60	Tuesday	Vegetarian	
17	Shumlin	Peter	18	PINE	50	50	Thursday	Nut Free	

- View Ribbon or Preferences to turn gridlines on or off
- Use border drop down on Home Ribbon to play with different kinds of lines around the cells

PRO TIP: Data Validation

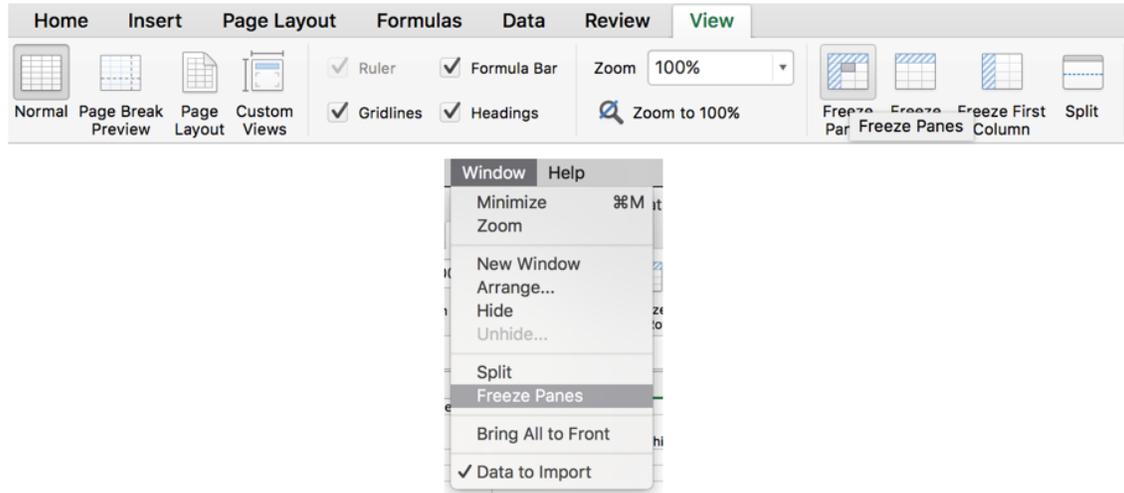


- Data Validation is a rule you can place on an area of cells to make sure they are being entered properly.
- For example, if you want to make sure that the only dates entered in your spreadsheets are between specific dates, you could use data validation to prompt an error alert when somebody enters a date that doesn't meet the criteria.
- It also helps you prevent errors in data entry
- Let's use it to make sure our dietary preferences are limited to a certain list to make the food order more streamlined.
- When you go to the Dietary Preferences column and click on the Auto-Filter, what do you notice? There are typos and inconsistency in data. This can be really problematic if we start building formulas that relies on the data appearing just one way; a formula or pivot table could miss information if it's entered in multiple formats.
- Let's start by creating a simplified list of diets based on the data provided.
- Select Column H and go to Data > Advanced Filter
- Choose to copy the data to another location and to copy unique records only.
- Correct the errors so there is just one type of each preference and reorder the list into ABC order.
- Select Column H again and go to Data > Validation

- In the Validation Criteria, select the List and identify the source as column O
- Create an Input Message and Error Alert

PRACTICE: Create a data validation rule to standardize Diet Preference in column H by creating an alphabetized drop down menu in column O. Hide Column O.

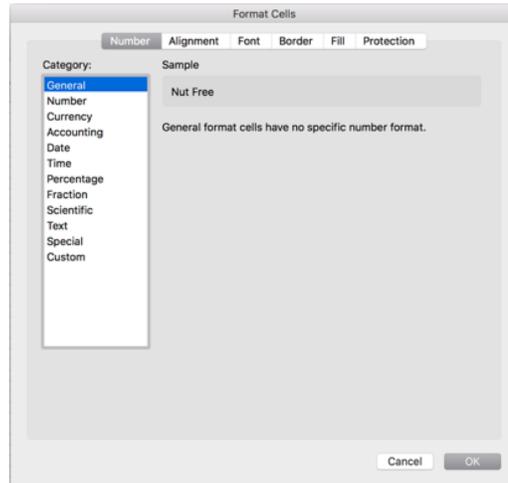
Basic Formatting: Freeze Panes



- Freeze Panes holds columns and/or rows in place so that you can scroll through information
- From the View Ribbon or Window drop down
 - Select the cell that is to the right of the column you want to freeze and underneath the row you want to freeze.
 - In the Window menu, select Freeze Panes.

PRACTICE: Freeze panes for the first 2 columns and header row.

Basic Formatting: Cell Format



- Right click on any cell and get the Format Cell window
- Or from Format menu

PRACTICE: Reformat Fee data in columns D&E to Accounting format.

PRO TIP: Data Protection

Protect the sheet and contents of locked cells.
All cells are locked by default, but can be formatted as unlocked.

Password (optional):

Verify:

Allow users of this sheet to:

<input checked="" type="checkbox"/> Select locked cells	<input type="checkbox"/> Delete columns
<input checked="" type="checkbox"/> Select unlocked cells	<input type="checkbox"/> Delete rows
<input type="checkbox"/> Format cells	<input type="checkbox"/> Sort
<input type="checkbox"/> Format columns	<input type="checkbox"/> Filter
<input type="checkbox"/> Format rows	<input type="checkbox"/> Use PivotTable reports
<input type="checkbox"/> Insert columns	<input type="checkbox"/> Edit objects
<input type="checkbox"/> Insert rows	<input type="checkbox"/> Edit scenarios
<input type="checkbox"/> Insert hyperlinks	

Cancel OK

Password (optional):

Verify:

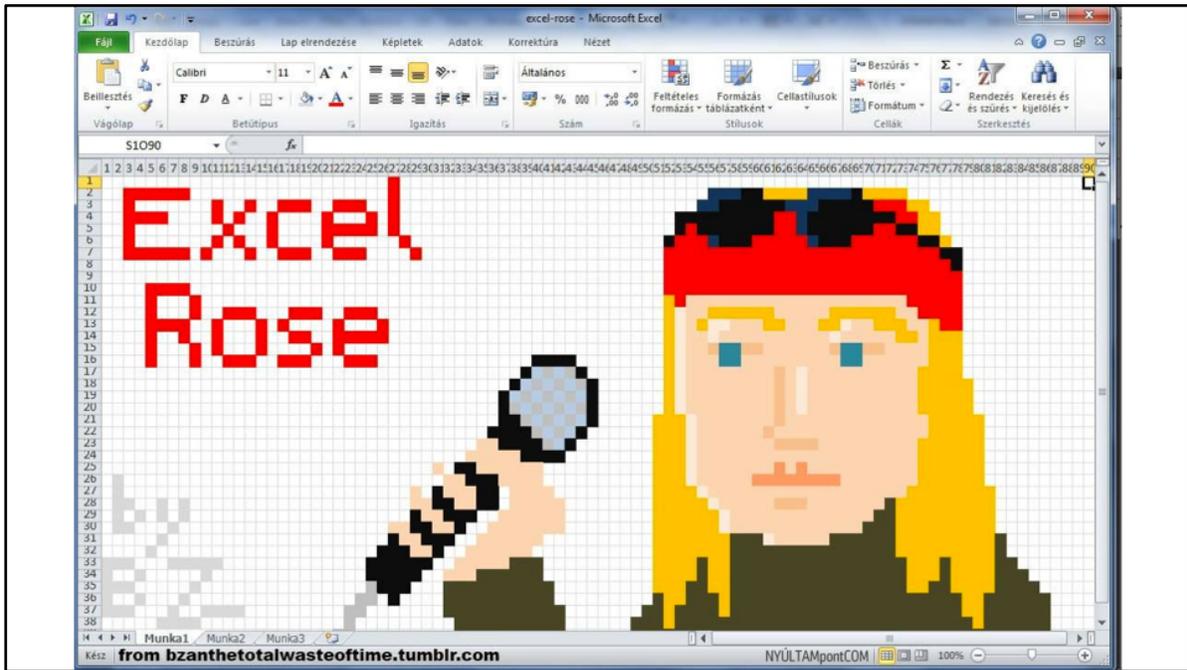
Protect structure
Sheets cannot be moved, deleted, hidden, unhidden, or renamed.
New sheets cannot be inserted.

Protect windows
Windows are the same size and in the same position each time the workbook is opened.

Cancel OK

- If you want to make sure your awesome spreadsheet doesn't get hijacked, protect the sheet.
- This works particularly well if you're using your sheet as a data entry form for other people to use.
- You can protect the cells that are not to be filled in (formulas, row headers, etc.) and not protect the cells that people will enter data into.

PRACTICE: Protect the worksheet and the workbook.



PART THREE:

Formulas & Functions

- Formulas can either be used like math equations or one of many Excel-specific functions.
- You can type in the values you want to use, or you can move your cursor to the cells you wish to include anywhere within the workbook.

FORMULAS: Formula Builder

The image displays two screenshots of the Excel Formula Builder interface. The left screenshot shows the 'CONCATENATE' function selected in the 'Most Recently Used' list. The right screenshot shows the 'AVERAGE' function being configured with a range of cells (E2:E34) and a numeric value (number).

Formula Builder (Left Screenshot):

- Search:
- Most Recently Used:
 - CONCATENATE
 - SUM
 - AVERAGE
 - IF
 - HYPERLINK
 - COUNT
 - MAX
 - SIN
 - SUMIF
 - PMT
 - All
 - ABS
- Insert Function

fx CONCATENATE
Joins several text strings into one text string.
Syntax
CONCATENATE(text1;text2,...)
• **Text1:** text1;text2,... are 1 to 255 text strings to be joined into a single text string and can be text strings, numbers, or single-cell references.
• **Text2:** text1;text2,... are 1 to 255 text strings to
[More help on this function](#)

Formula Builder (Right Screenshot):

- Show All Functions
- AVERAGE**
- Number1 = {50;0;70;45;55;65;50;60;70;0;0;...}
- E2:E34
- Number2 = number
- +
- Result: "39.6875"
- Done

fx AVERAGE
Returns the average (arithmetic mean) of its arguments, which can be numbers or names, arrays, or references that contain numbers.
Syntax
AVERAGE(number1,number2,...)
• **Number1:** number1,number2,... are 1 to 255 numeric arguments for which you want the
[More help on this function](#)

FORMULAS: Operators

OPERATOR	PURPOSE	EXAMPLE
+	addition	=A5+A7
-	subtraction or negtion	=A5-10
*	multiplication	=A5*A7
/	division	=A5/A7
%	percent	=35%
^	exponent	=6^2
()	order	=(1/((A5+A6)+(A8-A5)*4))
\$	absolute reference	=\$B\$1*A6
&	combining cell data	=A2&" "&B2

FORMULAS: Basic Types

BASIC MATH

= a+b [ADD]
= a-b [SUBTRACT]
= a/b [DIVIDE]
= a*b [MULTIPLY]

ADV MATH

= SUM
= AVERAGE / MEDIAN
= MIN / MAX
= ROUNDUP
= COUNT

TEXT

=CONCATENATE
=LEFT
=RIGHT
=UPPER
=LEN

LOGIC

= IF
= SUMIF
= COUNTIF

TIME

= DATE
= TIME
= NOW
= TODAY
= HOUR / MINUTE /
SECOND
= DAY / MONTH / YEAR

LOOKUP

= VLOOKUP

- Formulas can either be used like math equations or one of many Excel-specific functions.
- You can type in the values you want to use, or you can move your cursor to the cells you wish to include anywhere within the workbook.
- Formulas always begin with an =
- We're going to look at 6 kinds of formulas

FORMULAS: Nesting

```
=(1/((A5+A6)+(A8-A5)*4))
```

- Nesting allows you to tell Excel how a formula should be completed.... The order of operations.
- Nested parenthesis will change colors to help you keep track.
- Use of parentheses can not only help you avoid calculation errors but also help you better understand what the formula is doing.
- Every open parenthesis must have a matching close parenthesis.
- You can imagine that when you start adding lots of parentheses to your formula, determining which open parenthesis has a matching close parenthesis can get difficult
- Excel offers some help by color coding the parentheses while you're in Edit mode.
- Matching open and close parentheses will have the same color.

FORMULAS: References

Absolute reference

B3	:	= \$A\$1 +5
	A	B
1	10	15
2	9	15
3	8	15
4	7	15
5	6	15
6	5	15

Relative reference

B3	:	=A1+5
	A	B
1	10	15
2	9	14
3	8	13
4	7	12
5	6	11
6	5	10

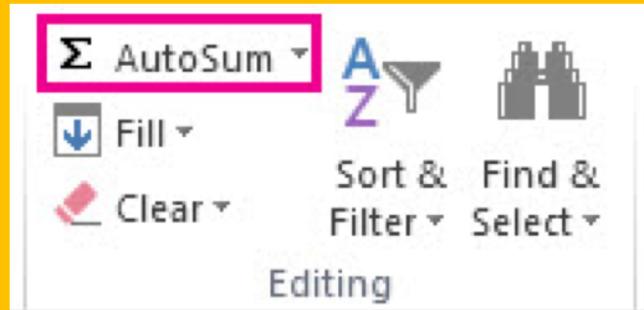
- Cells have either an “absolute” reference or a “relative” reference. By default, cells use a relative reference, so that as you add information to a sheet or copy formulas, the functions move along with the data. However, if you want a formula to reference a specific cell even when you copy that reference down, you want an absolute reference.
 - Relative: Default
 - Absolute: Add a \$ in front of either or both the column ID and Row ID
- Sheet References: Formulas can reference cells within the same sheet or in other sheets in a workbook. When a formula references a cell on its same sheet, the name of the sheet is not used. When a formula is referencing a cell in a different sheet, it includes the name of the sheet before the cell address in the formula.
 - Step 1: Start building the formula you want to build
 - Step 2: To reference a cell in another sheet, either click over to that sheet & cell or type the location as “Name of Sheet” + “!” + “Cell Address/Name”.

FORMULAS: Basic Math

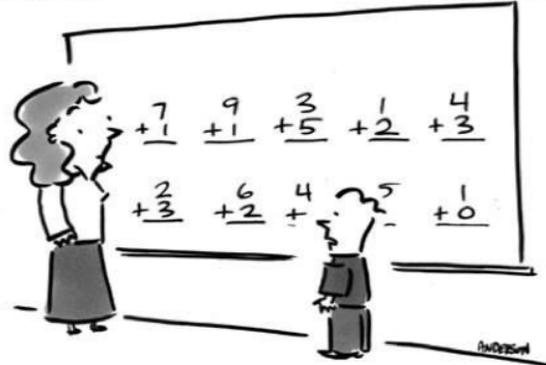
- = $a+b$ [ADD]
- = $a-b$ [SUBTRACT]
- = a/b [DIVIDE]
- = $a*b$ [MULTIPLY]

PRACTICE: Find out the total outstanding fee for each camper on the Data tab by subtracting the fee in column E from the amount paid in column E by in a new column (column G) and then add the range of the new column to determine the total amount you need to collect on the data tab. Update the header.

PRO TIP: Auto Sum



- Select a cell next to the numbers you want to **sum**, click **AutoSum** on the Home tab, press Enter, and you're done. When you click **AutoSum**, Excel automatically enters a formula (that uses the **SUM** function) to **sum** the numbers.



"All I'm saying is we plug these into Excel, let it do its thing, and then we can all play until lunch!"

FORMULAS: Text

- =CONCATENATE [Joins several text items into one text item]
- =LEFT [Returns the leftmost characters from a text value]
- =RIGHT [Returns the rightmost characters from a text value]
- =UPPER [Converts text to uppercase]
- =LEN [Returns the number of characters in a text value]

PRACTICE:

Create a unique ID for each camper in a new column (column A) by combining the first initial from first name (column B) and the first 3 initials from last name (column C). Update the header.

=UPPER(LEFT(B2,3)&LEFT(C2,1))

Create nametag text for each camper in the furthest row (column L) including first name, last name, and cabin name, all in upper case. Update the header.

=CONCATENATE(UPPER(B2&" "&C2&" "&E2))

FORMULAS: Time

- =DATE [Returns a date, from a user-supplied year, month and day]
- =TIME [Returns a time, from a user-supplied hour, minute and second]
- =NOW [Returns the current date & time]
- =TODAY [Returns today's date]
- =HOUR, =MINUTE, =SECOND [Returns the part of a user-supplied time]
- =DAY, =MONTH, =YEAR [Returns the part of a user-supplied date]

PRACTICE: Add a formula to the Worksheet tab to add today's date in cell D3

FORMULAS: Advanced Math & Stats

- =AVERAGE [Returns the average of its arguments]
- =MAX [Returns the maximum value in a list of arguments]
- =MEDIAN [Returns the median of the given numbers]
- =MIN [Returns the minimum value in a list of arguments]
- =ROUNDUP [Rounds a number up, away from zero]
- =COUNT [Counts the number of cells within a range]

PRACTICE:

Count the number of campers using the Age column on the Data tab in cell D4

Sum the amount of Fee Paid and Fees Due from the Data tab in cells D5 & D6

Calculate the average age of the campers in D7

Calculate the median age of the campers in D8

Find the oldest camper in D9 and the youngest camper in D10

FORMULAS: Logic

- =IF [Specifies a logical test to perform. Ex: =If(test,[value if true],[value if false])
- =COUNTIF [Counts the number of cells within a range that meet the given criteria]
- =SUMIF [Adds the cells specified by a given criteria]

PRACTICE:

Find the number of campers in each of the cabins in cells D13, D14, D15

Find the total amount of fees to be collected for each cab in cells D16, D17, D18

Identify the number of campers for each dietary preference in cells D21-25

Determine if you need to hire a specialty chef in cell D26 if the number of vegan and gluten free campers is more than half of the total number of campers.

=IF(((D24+D21)/D4)<0.5,"NO","YES")

Count the number of arrivals by day and the % of the total campers for D23-36

FORMULAS: Lookup

- =VLOOKUP [retrieves information from a database/list based on a unique identifier.]
- =VLOOKUP is a sophisticated way to look up information. More often than not, it is easier to just look up the information you seek. VLOOKUP becomes super useful if you're using it with a very large table of data, or if you need to look up information for several unique identifiers within a table, or in a reusable template (like an invoice).
- Lookup_value = the unique identifier you are looking up in the array
- Table_array = the location/range of the database
- Col_index_num = the piece of information you're looking for
- Range_lookup = helps to find the closest match
 - Use TRUE if the table is sorted
 - Use FALSE if the table is not sorted

PRACTICE: Create formulas to find the name, cabin, and amount owed for any Camper ID

=VLOOKUP(G4,Data!A1:L17,2,FALSE)&" "&VLOOKUP(G4,Data!A1:L17,3,FALSE)

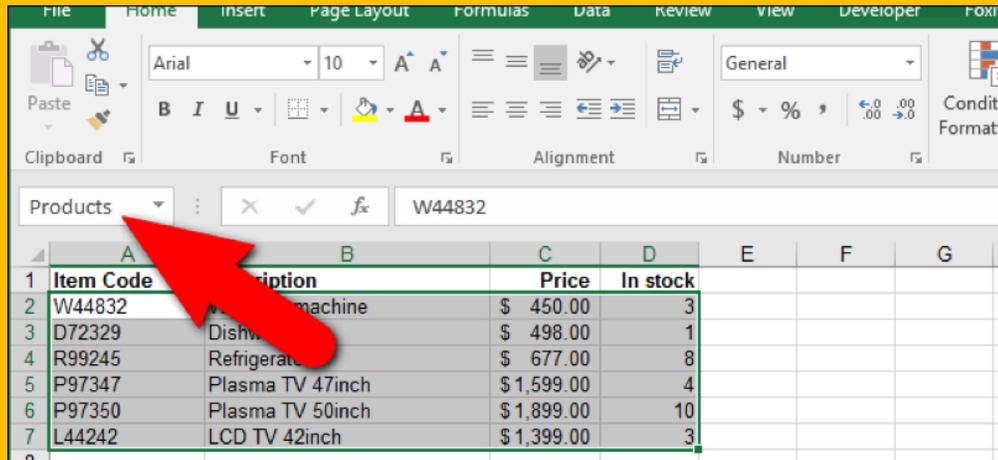
=VLOOKUP(G4,Data!A2:L17,5,FALSE)

=VLOOKUP(G4,Data!A1:L17,8,FALSE)

FORMULAS: Errors

ERROR	REASON
#NULL!	Occurs when you specify an intersection of two areas that do not intersect. The intersection operator is a space between references.
#DIV/0!	Occurs when a number is divided by zero (0).
#VALUE!	Occurs when the wrong type of argument is used.
#REF!	Occurs when a cell reference is not valid
#NAME?	Occurs when Microsoft Excel doesn't recognize text in a formula.
#NUM!	Occurs with invalid numeric values in a formula or function.
#N/A	Occurs when a value is not available to a function or formula.

PRO TIP: Naming Ranges



The screenshot shows the Microsoft Excel interface with the Name Box displaying 'Products' and the formula bar showing 'W44832'. A red arrow points to the 'Products' dropdown in the Name Box. The spreadsheet data is as follows:

	A	B	C	D	E	F	G
1	Item Code	Description	Price	In stock			
2	W44832	Washing machine	\$ 450.00	3			
3	D72329	Dishwasher	\$ 498.00	1			
4	R99245	Refrigerator	\$ 677.00	8			
5	P97347	Plasma TV 47inch	\$ 1,599.00	4			
6	P97350	Plasma TV 50inch	\$ 1,899.00	10			
7	L44242	LCD TV 42inch	\$ 1,399.00	3			
8							

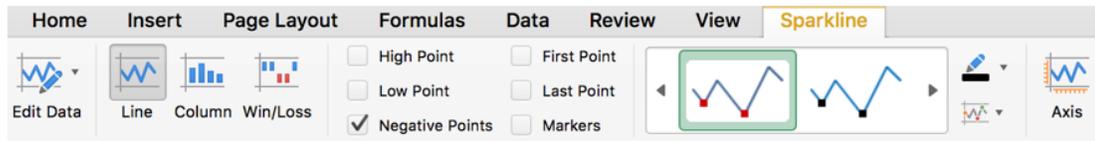
- If you want to reference something a bit more specific than just the address of a cell or a range when building a formula, you can name a cell or a range.
- Highlight the cell or range you wish to name
- Go to the name box and type the name of your choice
- From now on, use that name when building formulas

PART THREE:

Data Visualization

- Formulas can either be used like math equations or one of many Excel-specific functions.
- You can type in the values you want to use, or you can move your cursor to the cells you wish to include anywhere within the workbook.

VISUALIZATION: Sparklines



- A sparkline is a tiny chart in a worksheet cell that provides a visual representation of data.
- Use sparklines to show trends in a series of values, such as seasonal increases or decreases, economic cycles, or to highlight maximum and minimum values.
- Position a sparkline near its data for greatest impact.

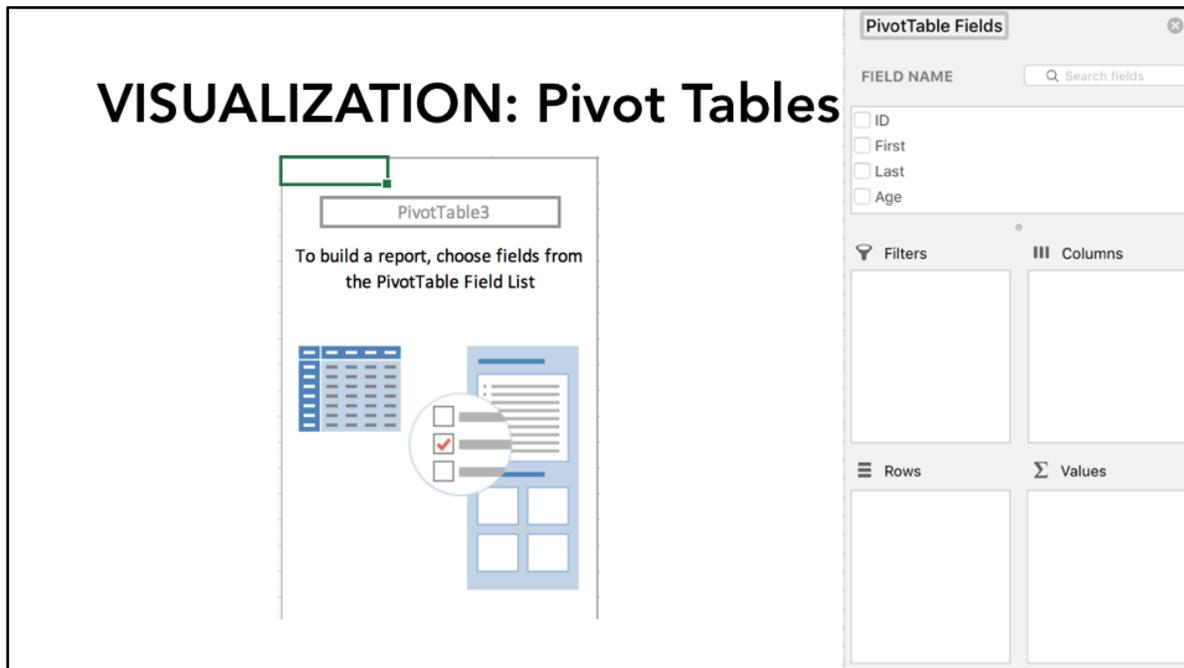
PRACTICE: Create sparklines in column F to illustrate data trends.

VISUALIZATION: Repetition

Data	Regular bar	with Playbill font
15		■
12		■
16		■
10		■
8		■

PRACTICE: Create an in cell bar and dot chart using =REPT to illustrate camper ages.

VISUALIZATION: Pivot Tables



- A PivotTable is a powerful tool to calculate, summarize, and analyze data that lets you see comparisons, patterns, and trends in your data.
- Pivot tables are a way to select & display certain information from a larger table or database. They can also be used as a jumping off point for creating charts. They can sort & sum, organize & simplify, data and create a summary of the spreadsheet.
- Data types in columns should be the same. For example, you shouldn't mix dates and text in the same column.
- PivotTables work on a snapshot of your data, called the cache, so your actual data doesn't get altered in any way.
- Select your table data
- Go to Insert Ribbon > Pivot Table
- Play with the arrangement of Filters, Columns, Rows, and Values to see your data represented in different ways
- Design your table based on the fields available by dragging fields into the areas below:
 - Filter – Allows you filter the table based on the field you enter.
 - Column – Add additional categories/criteria of information.
 - Row – Select the data categories you want.

Sum Values – Will sum any field of data.

Report Filter: This allows you to only look at certain rows in your dataset. For example, if I wanted to create a filter by house, I could choose to only include students in Gryffindor instead of all students.

Column Labels: These could be your headers in the dataset.

Row Labels: These could be your rows in the dataset. Both Row and Column labels can contain data from your columns (e.g. First Name can be dragged to either the Row or Column label -- it just depends on how you want to see the data.)

Value: This section allows you to look at your data differently. Instead of just pulling in any numeric value, you can sum, count, average, max, min, count numbers, or do a few other manipulations with your data. In fact, by *default*, when you drag a field to Value, it always does a count.

PRACTICE: Create a Pivot Table in a new worksheet to see dietary preference totals by cabin.

VISUALIZATION: Charts



Charts are a great and automated way to display data within excel.

Column: Comparison of 1 or more series of data points along 2 variables, typically time (x-axis) and amount (y axis).

Bar: Column chart on the side. Helpful if you want to emphasize data from the x-axis point of view (time).

Line: Great for displaying trends of 1 or many data points.

Area: Similar to Line, but with solid areas. Area Charts can be used to plot the change over time and draw attention to the total value across a trend. By showing the sum of the plotted values, an area chart also shows the relationship of parts to a whole.

Pie: Displays 1 series of data as parts of a whole (pie).

Scatter/Waterfall: Demonstrate how the values to 2 series compare over time.

Doughnut/Treemap: A Doughnut chart shows the relationship of parts to a whole. It is similar to a Pie Chart with the only difference that a Doughnut Chart can contain more than one data series, whereas, a Pie Chart can contain only one data series.

Bubble: A Bubble chart is like a Scatter chart with an additional third

column to specify the size of the bubbles it shows to represent the data points in the data series.

How Charts Work:

Step 1: Select the area of data you want to visualize (could be a pivot table)

Step 2: In the Insert menu, select Charts and choose the type of Chart you want

Step 3: Format Chart as desired

PRACTICE: Create a pie chart of Dietary Preferences on the Worksheet Tab. Try other charts!

Thank You!

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