

Microsoft Excel  
Data Analysis

Lesson Plan

A student with intermediate skills at Excel learns to employ the Subtotal and What-If Analysis tools.

Lesson Objectives

At the end of the class, the student will:

* Understand the basics of sorting data.
* Know how to use Subtotal.
* Understand What-If Analysis and how to use it.

Lesson Prep Work

(30 min, at a minimum, prior to student arrival)

* get in early to test for technology failure, because it will happen :-)
* pre-save Data Analysis.xlsx to the desktop on each computer.
* print handouts.

Lesson Prerequisites

* MS Word: Basics
* MS Excel: Basics
* MS Excel: Sort and Filter preferred
* MS Excel: Formulas and Functions preferred

Lesson Outline

The lesson is completed in one 60 minute class session.

# (5) minute Introduction

* Introduce instructor, students.
  + Ask students at introduction: How many people have used Excel before? How many have used Excel to look at statistics?
* Let students know it’s okay to take phone calls, but ask them to put their phone on vibrate and answer calls outside the classroom.
* Inform students that they can sit back and watch if the class is too advanced.
* Inform students they can go to the bathroom, they don’t need permission.
* Show order in which class will happen. Explain scope of class.

# (5) Vocabulary

* Ribbon and Tabs
  + Home Tab – where your most frequently accessed features are.
  + Data Tab – where you can organize data for clear concise reports.
  + You can tell what tab I have selected because it is highlighted in the ribbon.
* What is a subtotal?
  + Subtotal is a feature that allows you to group together like items in a column and get a report on their value.
* What is What-If Analysis?
  + What-If Analysis is a tool that allows you to find exactly what numbers you need to make a condition work. For example: how expensive a car can I get and still have payments below $400/month.

# (20) Subtotals

### Review Basic Sort

* + *Explanation*
    - We want a report of how much inventory we have in Ford v. Toyota.
    - Currently, Fords and Toyotas are splashed down the page at random.
    - Before we can perform a subtotal, we need to get all the Fords grouped together and all the Toyotas. We are going to use a feature called sorting.
    - If you struggle with this bit, please attend the next Excel: Sort & Filter class.
  + *Activity:* Sort worksheet by Brand.
    - Step 1 – Click anywhere in the brand field.
    - Step 2 – Click on Sort & Filter in the Editing grouping on the Home tab.
    - Step 3 – Click on Sort A to Z.
    - Point out that each row kept its information together, they were just rearranged so they were in alphabetical order by their brand.
  + *Comprehension Check: Perform a sort by Year, then by Date Received.* 
    - Point out that when you perform a new sort, the worksheet maintains most of the previous sort. So while you sorted by Year, you can see that the Fords are still together in 2012 and in 2013, as are the Toyotas.

### Subtotal by 1 Column

* + *Explanation*
    - The first subtotal we want to get is how much inventory we have in Fords v. Toyotas.
  + *Activity:* Subtotal worksheet by Brand.
    - Step 1 – Sort the worksheet by Brand.
    - Step 2 –Click on Subtotal in the Outline grouping on the Data tab.
    - Step 3 – Walk through the dialog box.
      * Ask students: “What do we want to see our subtotals for?”
      * Point out that we want a subtotal every time we see a new brand.
      * Choose to deliver a subtotal at each change in Brand.
      * Make sure it is using the function Sum.
        + Show options.
        + If students don’t understand the functions here, push them to Excel: Formulas & Functions.
      * Since we want to know our inventory, select the price option in the “Add subtotal to:” selection field.
    - Step 4 – Click OK.
      * Point out the Subtotals below Ford and Toyota and the Grand total at the bottom.
      * Point out the levels shown on the left most side of the page.
      * To see subtotals separate from the rest of the data, click on the number headers above the levels on the left of the worksheet.
      * *Teacher’s Tip: It is worth performing another subtotal for an unsorted column to demo why we sort the column first.*
  + *Activity:* Remove Subtotals.
    - Step 1 – Click on Subtotal in the Outline grouping on the Data tab.
    - Step 2 – Click on the Remove Subtotals button.
  + *Comprehension Check:* Insert subtotals for inventory for the year of vehicles.
    - Step 1 – Sort by Year.
      * Point out that there is also a Sort button on the Data tab. It does the same thing as the one on the Home tab.
    - Step 2 – Click on Subtotal.
    - Step 3 – Choose to show subtotal at each change in Year.
    - Ask students: “Why did we have to sort our worksheet first?”
      * Undo your subtotal and sort.
      * Perform the sort by year when it is still scrambled.
      * Point out that we have far too many reports showing up. We want our like items to show up together first.
  + *Activity: Independent Study:* Insert inventory subtotals for the Type of vehicle.
    - Instructor walks around the room to help students who are getting stuck.
    - Point out that if students didn’t remove the subtotal this time, it was automatically removed to make room for the new subtotal.

### Review Custom Sort

* + *Explanation*
    - Sometimes, you want to sort by more than one field. For instance, you may want a report for all the 2012 Fords, 2013 Fords, 2012 Toyotas & 2013 Toyotas.
    - In this case, we have to sort by two columns at once.
  + *Activity: Custom sort by Brand, then by Year.*
    - Step 1 – Click anywhere in the data, then click on Sort on the Data tab.
    - Step 2 – Set your first Sort By field to Brand.
      * Point out that we still need to add in Year to this equation.
    - Step 3 – Click on the Add Level button.
    - Step 4 – Set your second Sort By field to Year.
    - Step 5 – Click OK.
    - Your data is organized alphabetically by Brand first, then Year within Brand.
  + *Comprehension Check: Students Custom Sort by Type, then by Price.*

### Subtotal by 2+ Column

* + *Explanation*
    - Now that we can sort by 2 columns at once, we can also subtotal two columns.
  + *Activity: Get subtotal for Brand then Year.*
    - Step 1 – Custom sort by Brand first, then by Year.
    - Step 2 – Click on the Subtotal button on the Data tab.
    - Step 3 – Perform a subtotal for Brand.
    - Step 4 – Click on the Subtotal button on the Data tab.
    - Step 5 – Select Year for your next subtotal.
    - Step 6 – Before you click OK, uncheck the box at the bottom of the dialog box that says “Replace current subtotals”.
    - Point out that now we have our Subtotals for our Brands as well as the Years within the Brands.
  + *Comprehension Check: Get a subtotal for Year then Type.* 
    - If students go straight to their custom sort before they remove their subtotals, they will get an error message telling them Excel is going to remove their subtotals for them. Tell them to click on OK.
  + *Independent Practice: Get a subtotal for Brand, then Type, then Year.*
    - Instructor walks around the room and helps students.
  + Inform students that if they like these kinds of summaries, they should attend the Excel: Graphs and Pivot Tables class.
  + Ask students: “Where do you think you might be able to use this in your personal or professional lives?”

# (20) What-If Analysis

### Goal Seek

* + *Explanation*
    - Goal Seek allows you to find exactly what numbers you need to make a condition work.
    - It works with a single variable in a single equation. Data Table will give you answers to a question for a range of numbers.
    - Go to the Long Term Investment worksheet. Explain the Goal Seek setup:
      * What we need to know to figure out our payments for items with interest (like houses or cars or even credit cards) is:
        + the original amount of the loan (or the principal)
        + the annual percentage interest
        + how many years you plan on taking to pay it off (in this case expressed as months)
      * From these we can use an accounting function called Payment to calculate our total monthly payment.
  + *Activity: Calculate Total Value of Interest Payments*
    - Step 1 – Go to the Interest worksheet.
    - Step 2 – Type in values for Cost of Car, Interest and Year.
      * *Suggestions: 4000, 4.6%, 4*
    - Step 3 – Create a formula to calculate total interest paid.
      * *Teacher’s Tip: It is useful if students know this formula is not actually how you calculate compound interest. We are working with a simple formula to look at how the process works.*
      * *In cell B5, type in =B2\*B3\*B4.*
    - Step 4 – Add the total interest to the initial cost to know the total cost.
      * *In cell B6, Type in =B2+B5.*
  + *Activity: Use What-If Analysis to find a cost that has you pay less than $500 in interest.*
    - Step 1 – Go to the Data tab.
    - Step 2 – Click on What-If Analysis in the Data Tools grouping.
    - Step 3 – Click on Goal Seek.
    - Step 4 – Fill in the dialog box.
      * Set Cell: B5
      * To Value: 500
      * By changing cell: B2
    - Step 5 – Click OK.
    - Step 6 – Click OK.
      * *Teacher’s Tip: Explain that Goal Seek only works if you include a formula as one of your cells in the dialog box. The cells need to be referenced to each other in some way that Excel can recognize.*
  + *Activity: Find how expensive your house can be and still give you $1,500 payment/month.*
    - Step 1 – Go to the Long Term Investments Worksheet
    - Step 2 –Click on What-If Analysis in the Data tab.
    - Step 3 – Click on Goal Seek.
    - Step 4 – Fill in the dialog box.
      * Since we want to know how high our principal can be to achieve a $1,500 monthly payment, we want to set B6 to -1,500. The number is negative because it represents money leaving our pockets. If you type in a positive number here, it will screw up the equation.
      * The cell we want to change is our principal, cell B3.
    - Step 5 – Click OK.
  + *Comprehension Check:* Students use Goal Seek to find out how expensive their car can be to make their monthly payments $450.
    - Instructor walks around the room and assists students who get stuck.
  + *Comprehension Check:* Students find what interest rate they need to keep their payments under $500/month.
    - Instructor walks around the room and assists students who get stuck.
    - *Teacher’s Tip: Students will forget to make their set value to negative. Remind them as you walk around the room.*

### Data Table (Optional – depending on the skill level of the class – maybe)

* + *Explanation*
    - You may want to see a whole range of information instead of figuring out just one number.
    - In this case, we want to see what the monthly payment would be for a whole range of APRs.
    - We have already used the Payment function to figure out our monthly payments on a 30 year loan for a $300,000 house at 5.5% APR.
    - We want to see what the monthly payment would be on the same house at different APRs.
  + *Activity:* Create a Data Table for House Payments.
    - Step 1 – Select the range of your data table (minus the headings).
      * In this case, it would be cell A25 – C41.
    - Step 2 – Click on What If Analysis on the Data Tab.
    - Step 3 – Select Data Table.
    - Step 4 – Click in the Column Input Cell field.
      * Explain that we need to tell Excel where these APR values need to be inserted into our formula.
    - Step 5 – Click in the cell containing our formula’s original APR value.
      * In this case, cell B17.
    - Step 6 – Click OK.
  + *Comprehension Check:* Students create a second data table figuring out Monthly Payments for different house principles.
    - Instructor walks around the room to help students who get stuck.
    - If the majority of students struggled with following along on the previous example, perform this comprehension check as a group.

# (5) Homework

* *Explain:*
  + Students are expected to practice for at least 2 hours between each class.
* *What if Analysis tutorials at gcflearnfree.org.* 
  + Step 1 – Go to gcflearnfree.org.
  + Step 2 – Click on the Microsoft Office tile.
  + Step 3 – Click on Excel 2013.
  + Step 4 – Assign the tutorials on Sorting Data, Groups and Subtotals, and What-If Analysis.

# (5) Conclusion

* Go over handout, review material, and emphasize contact info & further resources on handout.
* Any questions? Final comments?
* Remind to take survey.