

EXCEL

14

Data Management for Business



In this chapter, you will explore some of the tools businesses use to manage vast amounts of data collected on customers, transactions, employees, and more. While not going into great depth, you will be introduced to the terminology, concepts, and tools available for analyzing and managing data.

LEARNING OBJECTIVES

- ▶ Import data from various sources
- ▶ Consolidate data from multiple sheets into one sheet
- ▶ Create a series of data using different methods
- ▶ Chart trends and save chart templates
- ▶ Use additional functions for lookups and logic

Project: Working with Multiple Data Sources

You have been maintaining the quarter one (Q1) sales data for the five Airspace Travel office locations in individual files. Now you want to put it all in one file for better analysis and as a model for how data for the rest of the year should be organized. You will also be summarizing and analyzing the Q1 sales data to create projections for Q2.

Importing and Exporting Data

Excel is certainly useful, but companies also use many other apps for a variety of business-related tasks. This means that data needs to be transferable between apps that are used for different purposes; for example, a business might use accounting software to perform the bookkeeping tasks and then import the financial data from the accounting software into Excel to create financial forecasts.

To effectively work with data from different sources, you must understand common database terminology and functionality. Databases are typically made up of numerous **tables**, which are made up of **fields** and **records**. For example, a coffee shop might have a database with tables for inventory, customers, and employees. The employees table would have fields for employees' names, IDs, and contact information, and the information for each employee would be their record.

To work across different applications, you should save the data in one of several common formats that most programs understand. This allows you to import and export data in and out of various programs that are otherwise incompatible. Characters such as commas, spaces, and tabs can be used as **delimiters**, which are any characters used to specify a boundary between fields when working with data.

One of the more common file formats for importing and exporting data is **CSV** (.csv), which stands for *comma separated values*. Data in a CSV file typically comes from a database, where data from each field is separated by a comma. Text files (.txt) are also common and usually use either a tab or a space to separate values rather than a comma. Excel will normally recognize the character being used, but you can also choose which delimiter to use during the import process. You can use CSV files to import and export data between Word, Excel, Access, and many more programs, including most accounting and database software.

Importing

Importing data creates a **query**. A query is essentially a request for information from an external data source, which could be a CSV or XML file, a website, an Access table, or other various sources and databases. The query then creates a connection between the Excel workbook and the data source, and you can choose how the data is imported and managed. Sometimes you may want to import the data once only, and other times you may want to ensure the data is updated continuously.

After importing data with a query, you can edit the query with the Power Query Editor, enabling you to manipulate the data inside the query instead of on the worksheet. Since some sources contain huge amounts of raw data, the query can summarize the data and eliminate the need to store the information on a worksheet to create summary tables or PivotTables, or to conduct further data analysis.

Exporting

To export data, you can save any file as a CSV version from the Save as Type option in the Save As window. Saving a file as a CSV will only save the active worksheet, because the CSV format does not support multiple worksheets. Other formats in which to save an Excel file include PDF, for a read-only file, and HTML, to create a web page.

Mail Merge with Microsoft Word

You might want to send a custom letter or discount offer via snail mail to a large list of customers. To do this, you would perform a mail merge in Microsoft Word. A mail merge has a main document with the same message for everyone, and then personalized information for customers using fields for each recipient, such as name and address. The list of recipients and fields can be created in a program like Excel or Access then exported by saving as a CSV, imported into Word, and used to perform the merge. The merge then replaces the fields for each recipient to create a unique document for each customer.

File → Save As → Save as Type

Data → Get & Transform Data → Get Data

DEVELOP YOUR SKILLS: E14-D1

In this exercise, you will import the February sales data from a separate file into your Q1 workbook. Once you have all data for the quarter in one file, you will be able to conduct analysis on it.

1. Start Excel, open **E14-D1-Q1** from your **Excel Chapter 14** folder, and save it as: **E14-D1-Q1Summary**

There is some data in the January sheet already, but notice that all information is missing for February and March. The February data is contained in a CSV file.

2. Go to the **Feb** sheet and choose **Data → Get & Transform Data → From Text/CSV**.
3. In the Import Data window, navigate to your **Excel Chapter 14** folder, select the **E14-D1-Q1 feb data** file, and click **Import**.

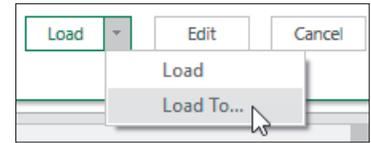
A new window opens, displaying the contents of the CSV file. Note the Delimiter type is Comma.

E14-D1-Q1 feb data.csv

Category	Los Angeles	New York	Miami	Toronto	Vancouver
Air Travel	58976	51672	120104	24672	67752
All Inclusive	142700	99220	82900	127150	119870
Bus Tours	15174	15768	4224	13332	25872
Excursions	6426	11184	11748	22410	23394
Hotels	32220	61975	43555	37500	33560
Theme Parks	3650	6480	11325	3105	2560

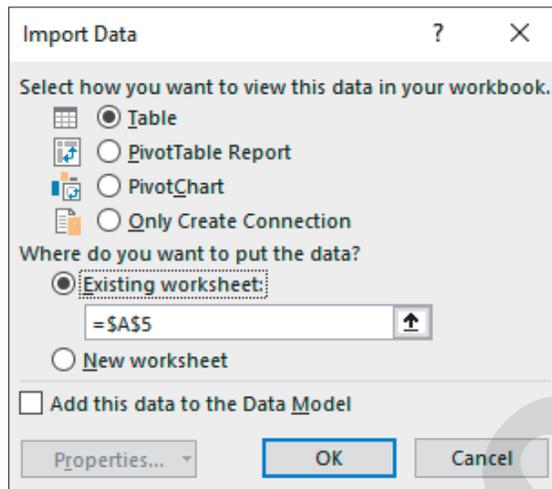
Rather than using the default settings, which would insert a new sheet in the workbook, you will change the load settings now.

- Near the bottom of the window, click the **Load menu** button ▼ and choose **Load To...**



In the Import Data window, you can see options for how and where the data will be inserted. Options for how to import include as a table, PivotTable, and PivotChart, any of which can be placed either on an existing or a new sheet. The other option is creating a data connection only and not actually pasting any information into the sheet.

- Leave **Table** selected, choose the option to put the data onto an existing worksheet, which will position it in cell A5 (the selected cell), and click **OK** to insert the data.



The data is inserted as a table, and the Queries & Connections pane opens on the right side of the Excel window, showing there is a query created to the E14-D1-Q1 feb data file.

In addition to the Table Tools contextual tab on the Ribbon, you will also see the Query Tools contextual tab, which allows you to edit, refresh, and perform other actions with the query.

- Save your work.

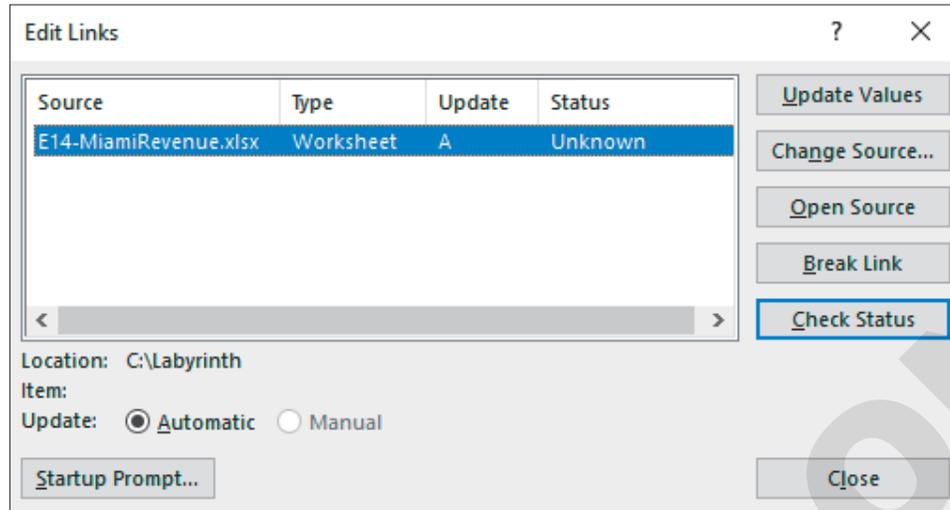
Importing Tables from Microsoft Access

Information can be shared between Excel and Access without converting to a CSV, as the programs are directly compatible.

External Workbook References

If the data you need exists in another Excel workbook, the data can be referenced between workbooks without importing the data. Creating an external reference creates a link to the data, so if the source data changes, the information in the destination workbook will be updated automatically by

default. You can modify links, open the source, break links, as well as adjust other settings from the Edit Links dialog box.



Data → Queries & Connections → Edit Links

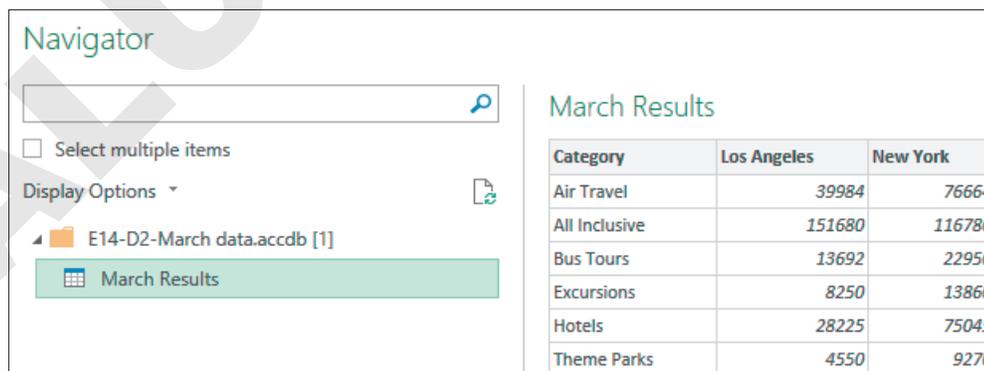
DEVELOP YOUR SKILLS: E14-D2

In this exercise, you will import the March data from an Access table. Then you will create a link to the data for Vancouver’s January results, which is currently missing.

1. Save your file as: **E14-D2-Q1Summary**
2. Go to the **Mar** sheet and choose **Data → Get & Transform Data → Get Data** **→ From Database → From Microsoft Access Database**.
3. In the Import Data window, navigate to your **Excel Chapter 14** folder, select **E14-D2-March data.accdb**, and click **Import**.

A new window opens, displaying the name of the database file, with March Results below.

4. Click **March Results** to preview its contents.



5. Click the **Load menu** button ▼ and choose **Load To....**
6. In the dialog box, choose to insert the data on an existing worksheet and click **OK**.
The data for February and March is now complete, and you can see two items in the Queries & Connections pane.
The last piece of missing information is the January Vancouver data. This data is in an Excel file and can be referenced directly.
7. Switch to the **Jan** sheet and then open **E14-D2-Vancouver** from your **Excel Chapter 14** folder.
8. Switch back to **E14-D2-Q1Summary** and select **cell F6**.

Tip!

You can switch between open windows in several ways: **[Alt]+[Tab]**, the taskbar, or **View→Window→Switch Windows** . Or, to have multiple workbooks visible at the same time, you can use **View→Window→Arrange All** .

9. Type **=** to begin the formula, then switch to **E14-D2-Vancouver** and, on the **Jan** sheet, click **cell B6** and tap **[Enter]**.

The formula in cell F6 on the Jan sheet in E14-D2-Q1Summary is:

='[E14-D2-Vancouver.xlsx]Jan!\$B\$6

This formula includes a reference to the workbook, sheet, and cell. The result is \$44,528.

Note!

References to other workbooks are absolute references by default.

10. In **cell F7**, repeat the process from step 9 to create a reference to the January results for Vancouver All Inclusive sales.
11. Edit the reference in **cell F7** to make it relative.
*Hint: Click the Formula Bar to place the insertion point at the end of the reference and tap **[F4]** three times.*
12. Copy the formula from **cell F7** down to **cell F11**.
13. Close the **E14-D2-Vancouver** file.
The formulas and references in column F of the Q1Summary file now include the path to the Vancouver file's storage location on your computer.
The data from the Vancouver file is linked and can be accessed, updated, or changed at any point via the Edit Links dialog box.
14. Save your work.

Summarizing Data

You can use PivotTables and 3D references to summarize data, but when working with different data sources across platforms, you may want to consider other options. In some cases, it may be necessary to import the data first; in other cases, you can use some of Excel's built-in tools or add-ons to get the job done:

- ▶ Queries
- ▶ Power Pivot
- ▶ Data models
- ▶ Cube functions

These require external data sources and extensive knowledge of the data you are working with. While a database is made up of fields and records, a data cube (like a PivotTable) summarizes the information across multiple groupings, such as dates, locations, and product categories. With a data model, such as a data cube, you can analyze data using cube functions instead of creating PivotTables. For example, CUBEMEMBER, CUBESET, and CUBEVALUE are some of the functions used to pull information out of the data cube.

Data Consolidation

You can also summarize data using the **Consolidate** command on the Data tab. If your data has similar labels across multiple worksheets, such as income or expenses from several different company offices, you can combine the data into one range in a few simple steps.

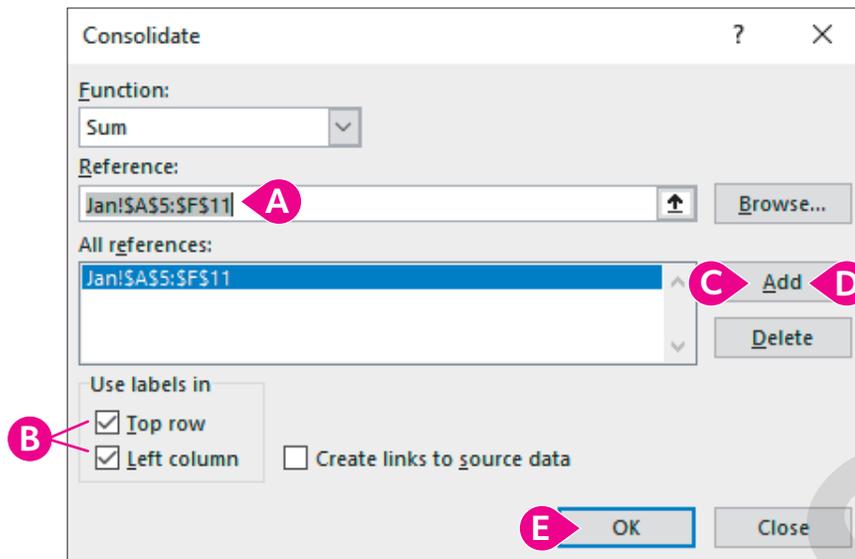
 Data→Data Tools→Consolidate 

DEVELOP YOUR SKILLS: E14-D3

In this exercise, you will consolidate the first quarter data from the Jan, Feb, and Mar sheets into the Q1 Summary sheet.

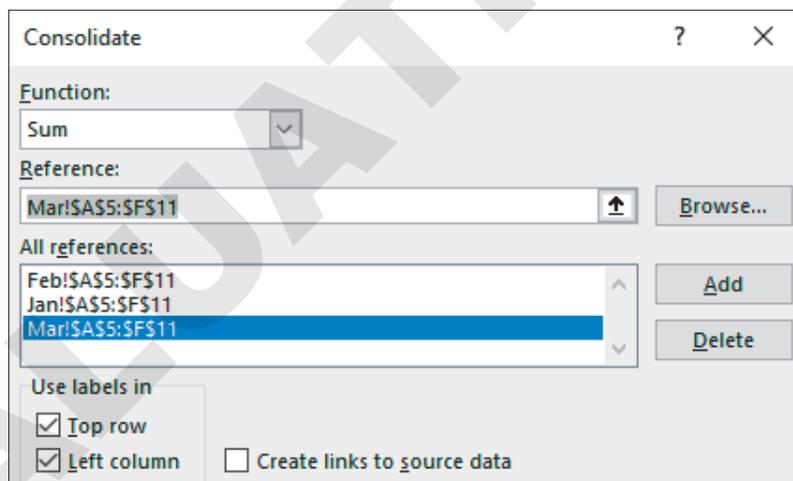
1. Save your file as: **E14-D3-Q1Summary**
2. Go to the **Q1 Summary** sheet and choose **Data→Data Tools→Consolidate** .

3. Follow these steps to consolidate the Q1 data:



The desired function, Sum, is already selected.

- A** Click in the **Reference** box and then go to the **Jan** sheet and select the **range A5:F11**.
- B** Check the boxes beside **Top Row** and **Left Column**.
- C** Click **Add** to add the selected range to the All References box.
Selecting additional sheets will automatically use the same cell locations on those sheets.
- D** Click the **Feb** sheet, click **Add**, click the **Mar** sheet, and click **Add**.
- E** Once all three references are added, click **OK**.



The consolidated data remains saved as part of the current worksheet and can be reused if desired.

- 4. In **cell A15**, enter the heading: **Q1 Averages**
- 5. Select the **range A3:G5** and then use **Format Painter** to copy the formatting and apply it to the **range A15:G17**.
- 6. Select **cell A17** and open the **Consolidate** tool, change the function to **Average**, and click **OK**.
- 7. Select the **range B18:F23** and change the number format to the **Comma Style** and remove the decimals.
- 8. Save your work.

Advanced Options for Filling a Data Series

Creating a series of values can be useful for making predictions and business decisions. You can create a data series based on existing data, past trends, or anticipated linear or exponential growth rates. For example, if a business examines costs and sees they have been increasing at a rate of 2% per year, they can create a set of data representing the expected costs for the next five years. Or, if they anticipate sales to increase from \$10 million to \$12 million in five years, they could create a set of data for that increase.

ABC Company					
Sales					
Current	Year 1	Year 2	Year 3	Year 4	Year 5
\$10,000,000	\$10,400,000	\$10,800,000	\$11,200,000	\$11,600,000	\$12,000,000
Expenses					
Current	Year 1	Year 2	Year 3	Year 4	Year 5
\$ 8,000,000	\$ 8,160,000	\$ 8,323,200	\$ 8,489,664	\$ 8,659,457	\$ 8,832,646

The values highlighted in yellow are created using the Fill Series command.

A linear series increases by the same number, while a growth series increases by the same percentage.

You can also select existing data and let Excel determine the trend for an increasing series of data. Or, start with a beginning value and an ending value, and let Excel fill in the missing values. There are many options; it all depends on how you want to use the information you do have to fill in the missing pieces of data.

- ▶ A series can be created in rows or columns.
- ▶ The series type can be linear, growth, date, or AutoFill.
- ▶ You can choose the step value (increase amount) for the series or choose to let Excel determine the trend.

☰ Home → Editing → Fill 

DEVELOP YOUR SKILLS: E14-D4

In this exercise, you will use information from the first-quarter sales to set sales goals for the second quarter.

1. Save your file as: **E14-D4-Q1Summary**
2. Go to the **Q2 Projections** sheet and select the **range D6:G6**.

After examining the Air Travel sales, you have determined a sales goal of 3% growth for the next three months.

3. Choose **Home** → **Editing** → **Fill**  → **Series...**

4. In the Series dialog box, choose **Growth** in the Type section, type **1.03** in the Step Value box, and click **OK**.

1.03 is equal to 103%, or an increase of 3%.

The goal for All Inclusive travel sales is to increase sales to \$615,000 in June, with steady growth in April and May to reach that goal.

5. In **cell G7**, enter: **615000**

6. Select the **range D7:G7** and choose **Home**→**Editing**→**Fill** →**Series...**

7. Leaving all settings as they are, note that the step value **11500** is identified and already entered and click **OK**.

The values 592,000 and 603,500 are entered to fill in the missing months that represent an increase of 11,500 per month.

Bus Tours and Excursions are seeing slower growth and unpredictable sales, so you want to be more conservative with these estimates.

8. Select the **range D8:G9** and fill in the two series using a **Linear** increase and a step value of: **3000**

Based on your market research and increasing advertising efforts, you believe Hotels is going to be an excellent source of revenue and will continue its rapid growth for the next three months.

9. Select the **range C10:G10** (February and March data) and fill in the series using the **Growth** increase type and selecting the **Trend** option.

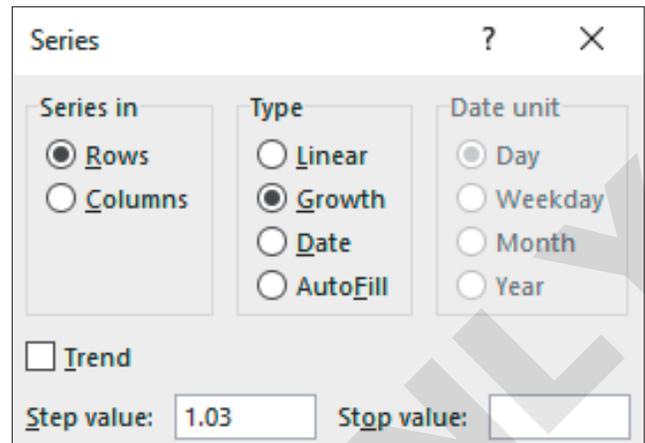
The resulting series shows values between 210,000 and 243,000, increasing by roughly 7% per month.

10. Select the **range C11:G11** (February and March data) and fill in the series using the **Linear** trend.

11. Insert the heading **Total** in **cell H5** and then use AutoSum to insert totals for each category in the **range H6:H11**.

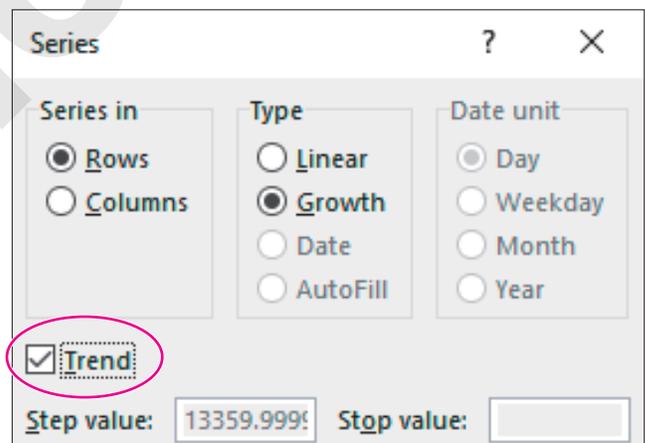
12. To make the data easier to read, select the **ranges B6:G6** and **H6:H11** and apply the **Accounting** number format with no decimals; apply the **Comma Style** number format with no decimals to the **range B7:G11**.

13. Save your work.



Series dialog box settings:

- Series in: Rows, Columns
- Type: Linear, Growth, Date, AutoFill
- Date unit: Day, Weekday, Month, Year
- Trend
- Step value: 1.03
- Stop value:



Series dialog box settings:

- Series in: Rows, Columns
- Type: Linear, Growth, Date, AutoFill
- Date unit: Day, Weekday, Month, Year
- Trend
- Step value: 13359.999
- Stop value:

Additional Charts and Chart Tools

After creating sets of data, you may want to explore ways to visualize the information and make it easier to understand. In addition to the simpler column charts, bar charts, line charts and pie charts, there are many more charts to choose from.

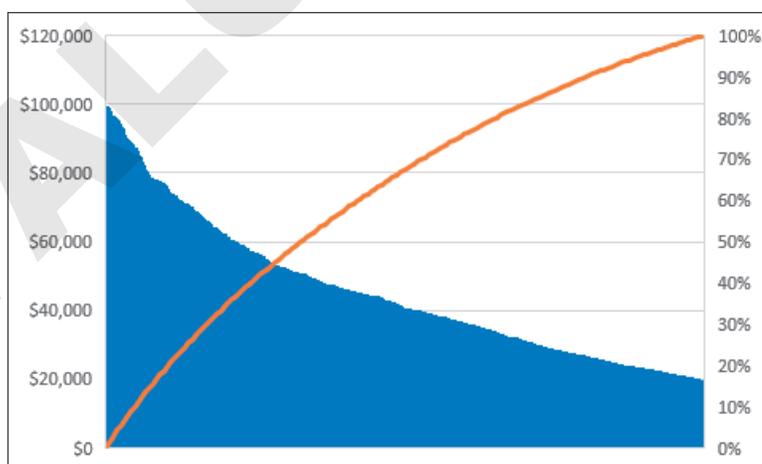
A **histogram** chart can be useful for grouping large amounts of data and showing the distribution of the data in groups. For example, a list of a thousand or more employee salaries would not produce a very useful column chart; however, a histogram could group those salaries into a chart showing how many employees earn between \$20,000 and \$30,000, \$30,000 and \$40,000, and so on. The histogram groups are called *bins*. In this example, the bin width is \$10,000 (and can be adjusted).



Another useful chart is the **Pareto** chart, which shows the significance of contributions of parts relative to the whole. For example, you could identify which sales categories contribute the most to the company's total revenue. The Pareto chart organizes the categories from highest to lowest, with a secondary axis and line indicating the increasing overall total.

Tip!

The Pareto principle (also commonly known as the 80/20 rule) states that 80% of your results come from 20% of your efforts!



MORE CHART TYPES

Chart Name	Description
Waterfall	Displays cumulative effects of positive and negative values, such as cash flow
Funnel	Displays progressively declining values as part of a process, such as sales conversions through the sales process
Sunburst	Shows data proportionally across levels, displayed as rings for each level
Box and Whisker	Displays variations in a data set when there are many sets of related data, such as tracking stock prices
Stock	Similar to Box and Whisker but requires data to be organized in a specific way

Adding Trendlines

A trendline is an indicator of overall increases or decreases in data and can be useful to help create future projections; for example, this is particularly useful for predicting income or expenses for budget purposes. You can add trendlines using a number of methods, similar to creating a data series. The trendline can be linear or exponential, or it can be created as a linear forecast or moving average. When tracking stock prices, for example, a useful chart might include the 50-day or 200-day moving average.

Saving a Chart as a Template

Once you have created and modified a chart to suit your specific purpose, you may want to save the chart as a template. Saving a chart as a template allows you to insert a new chart using the same chart settings but with different data. This can be a significant time saver.

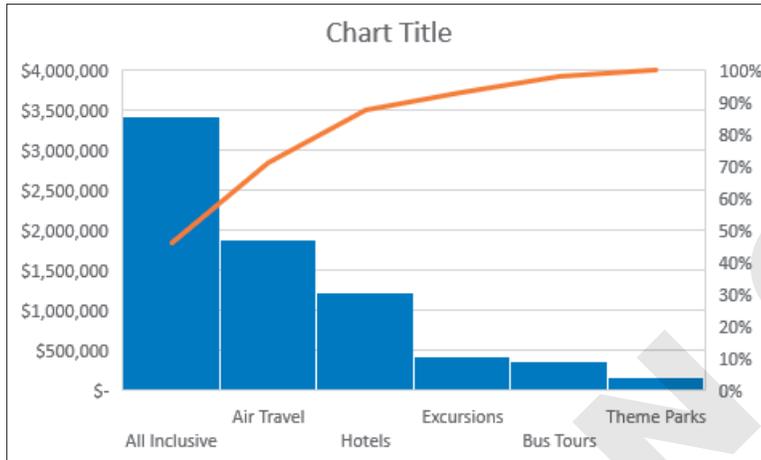
DEVELOP YOUR SKILLS: E14-D5

In this exercise, you will create a Pareto chart for all sales categories and then create a column chart and add a trendline.

1. Save your file as: **E14-D5-Q1Summary**
2. Select the **ranges A5:A11** and **H5:H11**.

*Hint: Use **Ctrl** to select them.*

3. Choose **Insert**→**Charts**→**Insert Statistic Chart**→**Pareto**.



This chart shows the order of the sales categories from largest to smallest, with the line indicating the increasing percentage of the whole. The last category, Theme Parks, is the smallest, and adding it to all the other categories places the line at 100%.

4. Drag the chart to place it below the data and delete the chart title.
5. To create the next chart, select the **range A5:G7** and insert a 2-D clustered column chart.
6. Drag the chart and position it to the right of the data (if the Queries & Connections pane is still open, you can close it).
7. To add a trendline, choose **Chart Tools**→**Design**→**Chart Layouts**→**Add Chart Element**→**Trendline**→**Linear**.
8. In the dialog box, choose **All Inclusive** and click **OK**.
9. Format the chart with **Style 14** and monochromatic colors of your choice, and then add the title: **Projected Revenue**
10. Right-click inside the chart area and choose **Save As Template**.

Tip!

You must point to the chart area, not a chart element like a column, line, or axis, to see the Save As Template option. The blank space to the left or right of the chart title is the easiest place to click.

11. Save the chart template in the default location as: **Linear Trend**
12. For the next chart, select the **ranges A5:G5** and **A8:G9** and choose **Insert**→**Charts**→**Recommended Charts**.
13. In the Insert Chart dialog box, click the **All Charts** tab, choose **Templates** on the left to display your saved Linear Trend template, and click **OK** to insert the chart.
14. Drag the chart to position it below the Projected Revenue chart and then edit the chart title to: **Projected Revenue**
15. Save your work.

Additional Lookup and Logical Functions

When you search for data in a large database, the VLOOKUP and HLOOKUP functions are useful, but they do have limitations: The data usually has to be sorted, and the functions can only look up values from left to right. There may be situations in which alternative methods are required.

Nesting the MATCH function inside the INDEX function allows for more flexibility in performing a data lookup. The INDEX function returns a value from a specified cell location, and the MATCH function determines what that location should be. For example, imagine you are looking for the first name of an employee whose ID number is 3572 (entered in cell G2) from a table where the first name is in column A and the ID number is in column D. The VLOOKUP function would not work because the ID column is to the right of the name column. However, you could use the formula `=INDEX(A2:A9,MATCH(G2,D2:D9))`.

	A	D	E	F	G
1	First Name	Employee ID#			
2	Janice	2145		ID:	3572
3	James	1289		First Name:	Jack
4	Jack	3572			
5	Jaclyn	8701			
6	Jada	7217			
7	Joyce	1323			
8	Joelle	4222			
9	Jeffrey	1699			

As you can see in the Formula Bar, the MATCH function in this example looks in the range D2:D9 for the cell that matches the value in cell G2 and returns the matching row number; the INDEX function then returns the value from the range A2:A9 from that row, in this case *Jack* (result shown in cell G3).

Other Logical Functions

In many cases you can use the IF function to determine one of two possible outcomes, true or false, based on a logical test. For other situations you may need to use additional functions such as AND, OR, as well as NOT, either independently or combined with other functions to create even more possibilities.

The AND function simply checks whether *all* arguments are true and returns TRUE if they are and FALSE if they are not. The OR function, on the other hand, checks whether *any* of the arguments are true and returns TRUE if at least one is. The NOT function is used to reverse the results of a logical function so TRUE becomes FALSE and FALSE becomes TRUE.

DEVELOP YOUR SKILLS: E14-D6

In this exercise, you will look up the employee name from the list and determine which employees should have a salary review.

1. Save your file as: **E14-D6-Q1Summary**
2. Go to the **Employees** sheet.

The Employee Lookup section has been completed for all fields except the Name field. Within this section, the formulas that return the position, location, and salary all use the ID#. You will create a formula to return the employee's name.

3. Enter this formula into **cell K6**: **=INDEX(A5:A33,MATCH(K5,C5:C33,0))**

The formula returns the name Kristen. The INDEX function returns the contents of the cell in the range A5:A33, in the position returned by the MATCH function; the MATCH function returns the correct position by finding the position of the contents of cell K5 in the range C5:C33 (the 0 argument means it must match exactly).

Now you want to determine if all the managers' salaries are at least \$50,000.

4. Enter this formula into **cell H5**: **=AND(F5="Manager",G5<50000)**

This formula checks if the position is Manager and salary is less than \$50,000. If both conditions are met, it will return TRUE. The result in cell H5 is FALSE.

5. Copy the formula in **cell H5** down the column for all employees.

Since TRUE and FALSE are not very useful, the AND function can be nested inside the IF function to return one result if the outcome is TRUE and another if FALSE.

6. Modify the formula in **cell H5** by nesting the AND function as follows:

=IF(AND(F5="Manager",G5<50000),"Review"," ")

Since the result of the first function was FALSE, the IF function returns the result for the value if false, which is a blank space; therefore, you will see nothing in cell H5 if the formula is entered correctly.

7. Copy the new formula down for all employees.
8. Use the **fill handle** to copy **cell G4** into **cell H4** and then edit the **column H** heading to: **Salary Review**
9. Save the file and close Excel.

Self-Assessment



Check your knowledge of this chapter's key concepts and skills using the Self-Assessment in your ebook or online (eLab course or Student Resource Center).

Reinforce Your Skills

REINFORCE YOUR SKILLS: E14-R1

Import Data and Fill Series

In this exercise, you will import fundraising data for the Kids for Change Events through six months and then use the data to project fundraising for the next six months.

1. Start Excel, open **E14-R1-6monthresults** from your **Excel Chapter 14** folder, and save it as: **E14-R1-6MonthProjections**
2. Choose **Data**→**Get & Transform Data**→**From Text/CSV** .
3. In the Import Data window, navigate to your **Excel Chapter 14** folder, select **E14-R1-eventsdata**, and click **Import**.
4. In the next window, click **Load**.

The data is loaded into a table on a new sheet.

5. Select the **range A2:G2** in the table, copy the data, and then switch to the **Summary** sheet and paste the values only into **cell A9**.
6. Hide **Sheet1**.

Now that you have the data, you are ready to create some estimates. You are projecting that individual donations will continue rising similar to the increase between May and June, so you will fill in July through December based on that trend.

7. Select the **range F5:M5**, open the Series dialog box, and click **OK** without changing any of the default settings.

The individual donations increase by 110 per month up to 6,260 in December. The corporate and door-to-door donations are expected to increase the same from June to December as they did between January and June, so you will calculate the December amount first and then fill in the rest.

8. In **cell M6**, enter this formula: **=G6-B6+G6**

The difference between June and January is added to the amount from June, resulting in expected donations of 4,900 in December.

9. Copy the formula from **cell M6** to **cell M7**, select the **range G6:M7**, and fill the two series based on the trend.

Hint: Check the Trend box but don't change any other settings.

Funds raised by phone and events are expected to increase by an average of 2% per month.

10. Select the **range G8:M9** and fill in the series using a growth step value of: **1.02**
11. Edit the subtitle in **cell A2** to: **Fundraising Results & Projections**
12. Format the donations from individuals with the Accounting number format and no decimals and then format all data for July through December with the light blue fill of your choice.
13. Save your work.

REINFORCE YOUR SKILLS: E14-R2

Create Charts

In this exercise, you will create a chart to display the projected donations for the year.

1. Save your file as: **E14-R2-6MonthProjections**
2. Enter **Total** into cell **A10** and then apply italic formatting and right-alignment.
3. Select the range **B10:M10** and use AutoSum to insert totals.
4. Select the range **A4:M10** and insert a combo chart with the Total data series as a line chart on the secondary axis (for all other series use Clustered Column).
5. Move the chart to a new sheet named **Projected Annual Donations** and change the chart title to match the sheet name.
6. Format the chart using **Style 6** and a monochromatic color of your choice.
7. Change the color of the line to **Standard Red** so it stands out from the columns more.
Hint: Right-click the line and choose the color from the Outline menu.
8. Add a linear trendline based on the Total series and format the line color with **Standard Yellow**.
9. Save the chart as a template called: **Annual Trend**
10. Save and close the file.

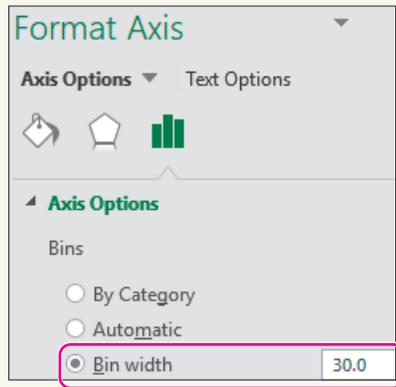
REINFORCE YOUR SKILLS: E14-R3

Insert a Histogram Chart and Functions

In this exercise, you will automate the task of copying information from one worksheet and inserting it into another worksheet.

1. Open a new, blank workbook and save it as: **E14-R3-StudentSummary**
2. Import the data from the **E14-R3-studentdata** file, located in your **Excel Chapter 14** folder, onto the existing sheet.
3. Replace the column headings with these:
 - **First**
 - **Last**
 - **School**
 - **January** through **December**
4. Rename the sheet: **Monthly Hours**
5. In cell **P1**, enter the heading **Total** and then use AutoSum to find the sum of volunteer hours for 12 months for each student.
6. Select the ranges **A1:A24** and **P1:P24** and insert a histogram chart.
7. Move the chart to a new sheet, renaming the chart title: **Volunteer Hours Distribution**
8. Right-click the horizontal axis and select **Format Axis...**

9. In the Axis Options settings of the Format Axis pane, choose **Bin Width** and enter **30** in the box.



The two largest groups are between 360 and 390, and between 450 and 480.

10. Return to the **Monthly Hours** sheet and enter the heading **Award** in cell **Q1**.
11. In cell **Q2**, enter this formula: **=OR(COUNTIF(D2:O2,0)=0,SUM(D2:O2)>500)**

This formula checks to see if the student either had no months with zero volunteer hours or more than 500 total volunteer hours for the year. If either condition is met, the result is TRUE; these are the students who will receive an award.

12. Save your work and close Excel.

Apply Your Skills

APPLY YOUR SKILLS: E14-A1

Consolidate Expense Data

In this exercise, you will import the expenses for two of the office locations at Universal Corporate Events and consolidate the data into one sheet.

1. Start Excel, open **E14-A1-HO_Expense** from your **Excel Chapter 14** folder, and save it as: **E14-A1-ExpenseSummary**
The expenses for four quarters are listed for the head office. You need to import the same expenses for the other two offices in Seattle and Chicago.
2. Import the data from **E14-A1-SEAexpdata** (a CSV file), located in your **Excel Chapter 14** folder, into a new sheet using the default settings. Rename the sheet: **Seattle**
3. Import the data from **E14-A1-CHIexpdata** (an Access database file), located in your **Excel Chapter 14** folder, and load it into a new sheet using the default settings. Rename the sheet: **Chicago**
The next step is to consolidate the data into one sheet.
4. Insert a new sheet, move it to the right of the Head Office sheet, and rename it: **Summary**
5. Consolidate the data from the **range A1:E11** on all three sheets, using the Sum function and the labels in the top row as well as the left column.
6. AutoFit the width of **column A** and apply cell style Accent 6 to the headings in **column A** and **row 1**. Center the headings in **row 1**.
7. Apply the Accounting style number format with no decimals to the **range B2:E2**, and Comma style with no decimals to the **range B3:E11**.
8. Save your work.

APPLY YOUR SKILLS: E14-A2

Look Up Expenses

In this exercise, you will create a formula that looks up an expense for any specified expense category and quarter.

1. Save your file as: **E14-A2-ExpenseSummary**
First you will enter labels and sample data.
2. In the **range A16:A18**, enter these three labels, with the colon after each:
 - **Category:**
 - **Quarter:**
 - **Amount:**
3. Use the **Format Painter** to copy the format from **cell A11** and apply it to the **range A16:A18**.

4. Enter this data into **cells B16** and **B17**:

- **Auto**
- **Q1**

Cell **B18** is where you need to enter the functions to look up the expense amount for the category and quarter using the information entered into cells **B16** and **B17**.

5. In **cell B18**, enter a formula that uses the INDEX function with these arguments:

Hint: Use the INDEX(array, row_num, [col_num]) function arguments.

- The Array is the data from the **range B2:E11**.
- The Row_Num must use the MATCH function and look up the category from **cell B16** with the category labels in the **range A2:A11**; the match type is zero for an exact match.
- The Column_Num must use the MATCH function again and look up the quarter from **cell B17** with the headings in the **range B1:E1**; the match type is zero for an exact match.

When complete, the result in cell **B18** should show 86647. The complete function in the Formula Bar is: =INDEX(B2:E11,MATCH(B16,A2:A11,0),MATCH(B17,B1:E1,0))

Compare your formula to the one shown and make corrections if necessary.

6. Apply bold formatting and the Accounting number format with no decimals to **cell B18**.
7. Edit the category and quarter to look up a new expense amount for: **Travel** and **Q3**
The result shows an expense amount of \$38,596.
8. Save your work and close the file.

APPLY YOUR SKILLS: E14-A3

Forecast Revenue

In this exercise, you will use existing data about sales from the current year to forecast revenue for next year. You will also chart the data.

1. Open **E14-A3-Revenue** from your **Excel Chapter 14** folder and save it as:
E14-A3-RevenueForecast

The data for the current year has been consolidated, and the average growth rate from quarter to quarter has already been calculated. Your first step is to fill in a data series for each revenue category.

2. Begin with the **Staff Party** category and, one by one, fill in the data series for each category for Q1–Q4 in 2020. Use the Q4 revenue in **column E** and the growth rates in **column J**.

Hint: Select Growth for the type and convert the Step value to a decimal. For example, Staff Party had a growth rate of 1.9%, so the step value is 1.019.

3. Insert a column to the left of **column F**, enter **Total** in **cell F4**, and then merge and center the **range F4:F5**.
4. Use AutoSum to calculate the 2019 totals in **column F**.
5. Select the **ranges A4:A10** and **F4:F10** and then insert a Pareto chart to display the totals.
6. Move the chart directly below the 2019 data and edit the chart title to: **2019**

The company wants to grow sales for each category to more than \$1 million annually, so the marketing budget will increase for any category that is still less than \$1 million if it also has a growth rate below 3%.

7. In **cell L4**, enter: **Increase Marketing Budget?**
8. Copy the format from the Growth Rate heading to **cell L4** and then widen the column to roughly 20 so the text is visible on two lines.
9. In **cell L6**, create a formula using the AND function to determine if the total in **cell F6** is less than \$1,000,000 and the growth rate in **cell K6** is less than 3%. Copy the formula down the column for all categories.
10. Save your work and close Excel.



Project Grader

This chapter does not include Project Grader exercises. Project Grader content is based on the learning objectives for a chapter, and sometimes those learning objectives cannot be accurately graded by the system. Objectives from this chapter that can be accurately graded may be included in later chapters, if applicable.

Extend Your Skills

These exercises challenge you to think critically and apply your new skills in a real-world setting. You will be evaluated on your ability to follow directions, completeness, creativity, and the use of proper grammar and mechanics. Save files to your chapter folder. Submit assignments as directed.

E14-E1 That's the Way I See It

You are setting goals for yourself once you finish school, including visualizing your financial goals. Create a new workbook named: **E14-E1-SalaryGoals**

Set a goal for your annual salary starting next year; be realistic but also set the bar high! Add the year and the salary below that, and to the left a suitable heading. Think of at least one other financial goal, such as paying off a debt or saving money. Enter a heading for that goal in the next row and the first entry below next year. Add more goals if you choose. Use the fill handle to create the headings for the next five years across the top. Fill in a series for each goal for the next five years. Use at least two different Fill Series options (e.g., set a goal to increase your salary by 5% each year and reduce your debt from \$12,000 to zero in five years). Finally, create a chart displaying the goals and add a trendline to at least one series. Format the chart and worksheet appropriately, including number formatting and adding a chart title.

E14-E2 Be Your Own Boss

Blue Jean Landscaping gives customers a discount for the hours they work on their own landscaping. The customer hours from the last year are saved in two CSV files, and you need to analyze and consolidate the information into one file. Create a new workbook named **E14-E2-ClientHours** and import **E14-E2-clientdata1** and **E14-E2-clientdata2** into new sheets. Rename Sheet1: **Summary**

Consolidate the data from both sheets into the Summary sheet, noting the labels at top and left. Delete the First Name and Category columns; insert a total column and calculate the total yearly hours for each client. Use the heading *Discount Rate* in a new column and use the OR function nested in an IF function to determine if the client worked more than 20 hours in at least three months or more than 200 hours total. If either condition is true, they get \$17 per hour; if not, \$15 per hour. (Hint: Build the function step by step. Start with `=COUNTIF(B2:N2,">20")`, determine if that result is greater than 2 or if `N2>200`, then nest that in an IF function.) Last, use the heading *Discount* in another column and multiply the rate by the total number of hours. Format the headings, client names, and dollar amounts so the Summary sheet looks professional.

E14-E3 Demonstrate Proficiency

Stormy BBQ tracks sales for each flavor of BBQ sauce and now, at the end of the year, you're analyzing the data. Open **E14-E3-SauceSales** and save it as: **E14-E3-SauceSalesAnalysis**

Create two Pareto charts, one for the month and monthly totals, and another for flavors and annual totals, to highlight the months and the flavors with the highest sales. Resize, reposition, and rename the charts appropriately. Create a lookup to find the number of bottles and the revenue for the flavor specified in cell G4. Begin by entering a flavor in cell G4 and then insert a column to the left of column H. In cell H4, use the MATCH function to find the position of the chosen flavor in the columns. (Hint: Find an exact match and use 0 for the third argument.) Insert the INDEX function in cells I4 and J4, the first to look up the number of bottles and the second to look up the price per bottle, which can be multiplied by the result in cell I4 to get revenue. (Hint: The INDEX function is looking for information in rows 4 and 18, so select the data for the array, then enter row 1, then use the result of the MATCH in cell H4 for the column argument in both.) Once the INDEX functions are entered, hide column H and test the formulas by entering a different flavor in cell G4.