OVERVIEW

In this exercise, you will begin working with data and learn some foundational skills for studying cities. Sustainability is a concept that continues to gain support among urban planners and bridges a variety of issues and fields of study. You will choose an indicator for each of the three dimensions of sustainability (i.e., economy, environment, equity) and use Microsoft Excel to produce charts and graphs that help communicate how those indicators have changed over time.

The spreadsheet provided contains information from both state and federal sources for the seven-county Chicago metropolitan area (using CMAP boundaries). The three tabs within the spreadsheet (called Economy, Environment, and Equity) each contain data for multiple measures that might be used as indicators. Your task is to choose one measure from each of the three tabs and create a chart or graph that helps us to understand progress toward sustainability in the Chicago metropolitan area. You will then insert these graphics into a brief lab report for submission and grading.

EXAMPLE 1: CREATING A PIE CHART

The pie chart is one of the most familiar and flexible graphics for analyzing and displaying data. This example demonstrates how to create and refine a pie chart using population data for the seven-county region. You may decide to use a pie chart for one of the three indicators you choose to analyze by repeating these steps for those data.

**Step 1.1:** Launch your web browser and navigate to the Compass site for this course. Click the “Assignments” link from the course homepage (towards the bottom), then click the “Week 1” link. Click the “Week 1 Data” link and save the spreadsheet to: (1) your USB drive, (2) the C:\Workspace directory, or (3) the C:\Temp directory.

**Step 1.2:** Open the file called “Week_1_Lab_Data.xls” by double-clicking it from the location where it was saved in Step 1.1. Create a new tab by clicking the icon in the lower left of the spreadsheet:
Step 1.3: Click the newly created tab at the lower left of the spreadsheet, then click the “Insert” tab found at the upper left of the spreadsheet. Click the drop-down menu labeled “Pie” on the insert toolbar as shown:
Click one of the chart types displayed and a blank chart area will appear:

Step 1.4: Right-click the blank chart area and choose “Select Data” as shown:
Next, click the tab that contains the data you have chosen to analyze and use the cursor to select the cells in the appropriate column or columns. In this example, I want to compare pie charts for population distribution across counties in 2000 and 2009. I will begin by selecting the data in the “2000” column.

Click the “OK” button to perform the operation.

**Step 1.5:** Take a look at the resulting pie chart. We need to add labels. Right-click the chart area and choose “Select Data” as before. Click the “Edit” button on the right under “Horizontal (Category) Axis Labels”. The “Axis Labels” window will appear. From this window, click the “Select Range” icon (shown below), click the tab that contains the data, and use the cursor to select the cells with the county names.
Click the “OK” button to add the county name labels to the chart.

**Step 1.6:** It would also be useful to display each county’s percent contribution to the overall regional population on the chart as well as a title to clearly communicate what the chart represents. To accomplish this, simply click on one of the “Chart Layout” options displayed in the “Design” tab of the “Chart Tools” toolbar (upper center).

Experiment with these layouts until you find one that you like. Be sure to modify the default title to reflect the data you are analyzing.

To resize the pie chart, select one of the corners with your cursor and drag.
In order to compare county population distribution at two points in time (in this case 2000 and 2009), you would simply create a second pie chart using the data in the "2009" column.

Microsoft Excel graphics can be copied and pasted into Microsoft Word documents. This is the approach you should use when preparing your lab report. You could present two pie charts side-by-side and discuss how the distribution of population across counties is different in 2009, relative to conditions in 2000.
**Example 2: Creating a Bar Chart**

Bar charts are another type of graphic that is commonly used to analyze and summarize data. In Microsoft Excel, bar charts are created in much the same way as pie charts but offer some distinct advantages.

**Step 2.1:** Add a new tab to your spreadsheet (see Step 1.2 if necessary). Click the newly created tab at the lower left of the spreadsheet, then click the “Insert” tab found at the upper left of the spreadsheet. Click the drop-down menu labeled “Bar” on the insert toolbar, and choose “All Chart Types” as shown:
Choose one of the vertical bar layouts from the “Insert Chart” window and click the “OK” button.

**Step 2.2:** Right-click the blank chart area and choose “Select Data”. Next, click the tab that contains the data you have chosen to analyze and use the cursor to select the cells in the appropriate column or columns. In this case, we will use county population as a percent of the regional total.
Note in the image above that data for all years are selected. Click the “OK” button to perform the operation.

**Step 2.3:** Take a look at the resulting bar chart. We need to add labels for each of the data series (counties) and also a title for the bar chart. Right-click the chart area and choose “Select Data” as before. Click the “Edit” button on the right under “Horizontal (Category) Axis Labels”. The “Axis Labels” window will appear. From this window, click the “Select Range” icon, click the tab that contains the data, and use the cursor to select the cells with the years (column headers).

Then, on the left side of the “Select Data Source” window highlight the series entries one-by-one, click the “Edit” button, and choose the corresponding county name from the tab with the data.

When finished updating each of the series names, click the “OK” button.

Take another look at the resulting bar chart. Add a title if you have not already done so (refer to Step 1.6 if necessary).
**Example 3: Creating a Line Chart**

The third and final example focuses on the creation of a line chart using population density data for the seven-county Chicago region. One of the advantages of line charts is their ability to clearly communicate change over time.

**Step 3.1:** Add a new tab to your spreadsheet. Click the newly created tab at the lower left of the spreadsheet, then click the “Insert” tab found at the upper left of the spreadsheet. Click the drop-down menu labeled “Line” on the insert toolbar, and choose the first option displayed.

**Step 3.2:** Right-click the blank chart area and choose “Select Data”. Next, click the tab that contains the data you have chosen to analyze and use the cursor to select the cells in the appropriate column or columns. In this case, we will use same data as with the bar chart.
Note in the image above that data for all years are selected. Click the "OK" button to perform the operation.

**Step 3.3:** Take a look at the resulting line chart. We need to add labels for each of the data series (counties) and also a title for the line chart. Right-click the chart area and choose “Select Data” as before. Click the “Edit” button on the right under “Horizontal (Category) Axis Labels”. The “Axis Labels” window will appear. From this window, click the “Select Range” icon, click the tab that contains the data, and use the cursor to select the cells with the years (column headers).

Then, on the left side of the “Select Data Source” window highlight the series entries one-by-one, click the “Edit” button, and choose the corresponding county name from the tab with the data.
WORK PRODUCTS

Please submit a report that is 1-2 pages in length (use a 12 point font and 1 inch margins) that briefly summarizes your findings. Interpret each of the three graphics you created and explain what they tell us about the Chicago region’s level of progress toward sustainability. Comment on whether the three indicators you chose suggest improvement, decline, or no change in terms of achieving a stronger economy, healthier environment, and more socially equitable Chicago region.

A suggested outline for the report is given below:

I. Introduction: what is the purpose of the assignment?
II. Indicators: which indicators did you choose to analyze? Why did you choose them?
III. Findings: what do the charts you created and the data tell us about the economy, environment, and level of social equity in the Chicago region?
IV. Conclusions: is the region making progress towards sustainability based on your analysis?