Video: "Line Graphs in MATLAB" (8:34 min)

"Line Graphs in MATLAB" (0:00):
      This video takes you through lesson 2 line graphs in MATLAB. We will begin by using the load command to load variables from the .mat file, then we will pick out some rows and columns to plot and use assignment and we will define variables. Finally, we will show several ways to display multiple plots on the same graph.

MATLAB Code Window (0:25):
      I have already created a lesson 2 folder under Z:\working\MATLAB\Lesson2 and I downloaded the data for this lesson into the current folder. I can right click in the current folder panel to create a new script. My script will be called lesson2Script. I click on the script to open it in the editor and begin entering cells to develop the script. I use the load command to load the file NYCDiseases.mat into the workspace. Now I save my script by pressing the save icon and execute the cell by evaluate and advance. MATLAB loaded 4 arrays. Measles for example has 41 rows and 12 columns corresponding to the monthly measles counts in New York City for the years 1931-1971. Let's take a close look at measles. We create a new figure and use plot to plot the columns of measles. We evaluate the cell by using the evaluate icon. The plot of measles is too cluttered to read, let's see if we can understand the data better by just looking at 1 year of data.

Define Variable Cell (1:49):
      I'll start by creating a new cell and defining a new variable for the 1931 data which is the first row of measles. I need to create a variable so I can refer to it using commands. I name the variable mealses1931 so I know what data it contains. I have to execute the cell in order to create the variable. I change the plot command to use measles 1931 and display the new graph, unfortunately it is not labeled. I'll us xlabel, ylabel, and title to do the standard labeling. The x-axis plots months and the y-axis shows number of cases. The title provides an overview of the graph. We save the script and execute the cell to show the graph. The graph is labeled and the month of May looks interesting. The large values on the y axis make this graph hard to read.

Rescale Y and plot Measles May (3:10):
      I'll rescale to show cases in thousands. I'll start with a copy of the code in a new cell. Let's first document what this cell is going to do. I'll change measles1931 to thousands of cases simply by dividing it by 1000. I'll also need to change the ylabel to reflect the change I just made. I'll save and execute the cell and I see a nicely labeled graph which I can compare to the previous one. Measles in May seems unusually high. Let's look at May measles measurements for all years. I'll start by defining a variable for measles in May. I'll keep my variable definitions together in the script, although you can put them anywhere. I'm selecting all rows and column 5 of measles. I save my script and execute it in order to create the new variable. I'll make a copy of the previous code for the previous plot as a starting point for plotting measles May. Let me make sure my documentation is up to date so I don't get confused later. I want to plot measlesMay so I change the name from measles1931 to measlesMay in the plot command. I'll

need to adjust the label for the x-axis and the title as well. Let's execute the cell and see what the graph looks like. The graph would be more readable if xlabel showed the actual year instead of the numbers 1-41.

Adding the Years to xlabel and compare 1931 and 1941 (5:29):

I have a variable years in my workspace which contains the years 1931-1971. I'll use this variable with the x y form of plot to get a better graph. Let me execute the cell to re-plot the graph. The new graph has the years on the x-axis. Notice the big change between 1940 and 1941. Let's compare 1931 and 1941. Let's create a variable for measles1941, it's 10 rows down from measles1931 so it will be row 11 of measles. I'll execute the cell to make sure measles1941 gets created. I'll create a new cell for my comparison plot and I'll use the plot from 1931 to get started. Before I forget, I'll update the documentation. I'm comparing measles1931 with measles1941 in a rescaled graph. I'll start by adding another plot command for measles1941 on the same graph. I'll have to adjust the title also. I'll execute the cell to show the graph, but notice that only one plot appears. This is because MATLAB overrides plots by default. The solution to this dilemma is to use the hold on and hold off commands to prevent the plots from being overwritten. Now when I execute the cell, I see two graphs. Unfortunately, the lines are not distinguishable. I'll start by putting a legend in. The first curve corresponds to 1931, the second to 1941. I enclose each name in single quotes. To better distinguish the data, I'm going to plot the two lines in different colors using a plot format specifier. I'll plot the 1931 data using a blue line with squares to mark the individual data points. We will use a black line for the 1941 data with circles to mark the individual points. When I execute the cell, I see that I have a nicely labeled graph with two distinguishable lines marking the 1931 and 1941 data.