

Dr. Katiraie Math 115A Notes For Section 2.2 (Graphs, Picturing Growth)

Making a graph

Day (Independent Variable)	1	2	3	4
Cars Sold (Dependent Variable)	3	6	5	2



Draw Picture:

Key concept—A scatterplot is a graph consisting of **Isolated** points, with each **dot** corresponding to a data point

Key concept—To make a line graph we begin with a scatterplot and **Join** the **Adjacent** points with straight line **Segments**.

Copy down the example

- ▶ Example: The running speed of ants varies with the ambient temperature. Here are data collected at various temperatures:

First make a scatterplot of the data showing the speed as the function and the temperature as the independent variable, then make a line graph using these data.

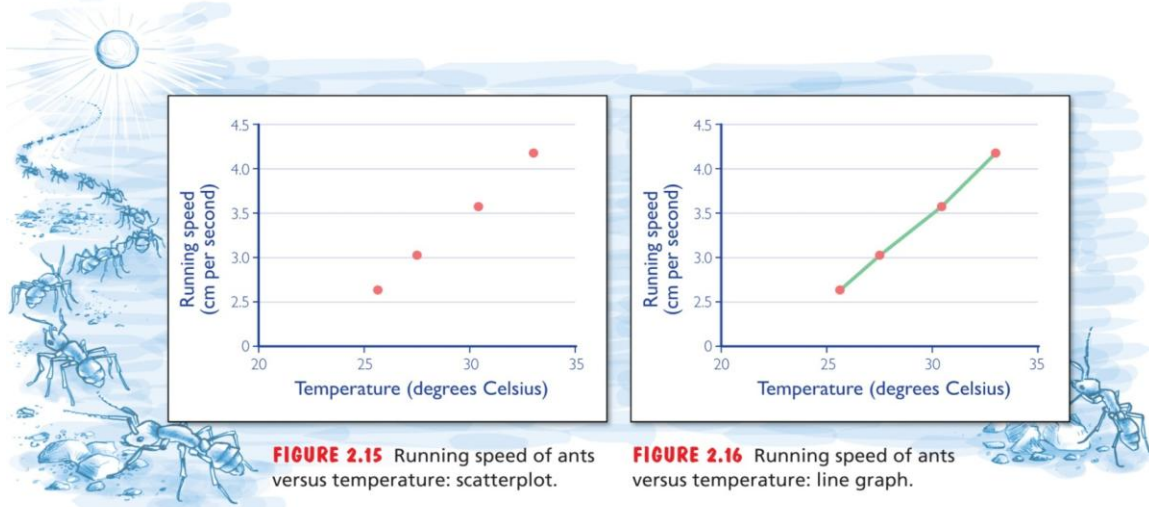
Temperature (degrees Celsius)	Speed (centimeters per second)
25.6	2.62
27.5	3.03
30.4	3.56
33.0	4.17

Using your graphing calculator

1. Press 2nd Y= to access the STAT PLOT menu.
2. You can store up to three plots at a time. Choose Plot 1, and press ENTER.
3. Highlight On, press ENTER.
4. Highlight the first type plot shown, press ENTER.
5. For the XList, choose whichever list you used to store your first set of data (usually, this is L1), press ENTER.
6. For the YList, choose whichever list you used to store your second set of data (usually, this is L2), press ENTER.
7. Choose your mark, press ENTER. The first mark is the easiest to see.
8. Go to the Y = menu and clear or inactivate any existing functions.
9. Set the window automatically to see all of your data points by pressing ZOOM and then ZoomStat (#9). Alternatively, you can go to WINDOW and adjust the window settings yourself.

- ▶ **Solution:** To make a scatterplot, we plot the data points on the graph: (25.6 , 2.62),..., (33.0, 4.17).

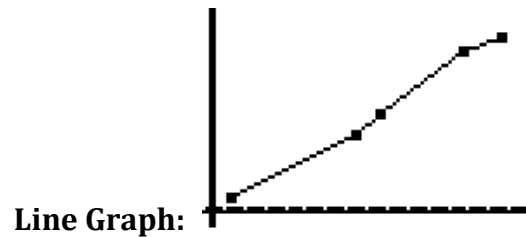
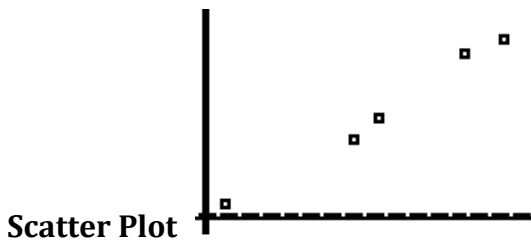
We join the points with line segments to get the line graph.



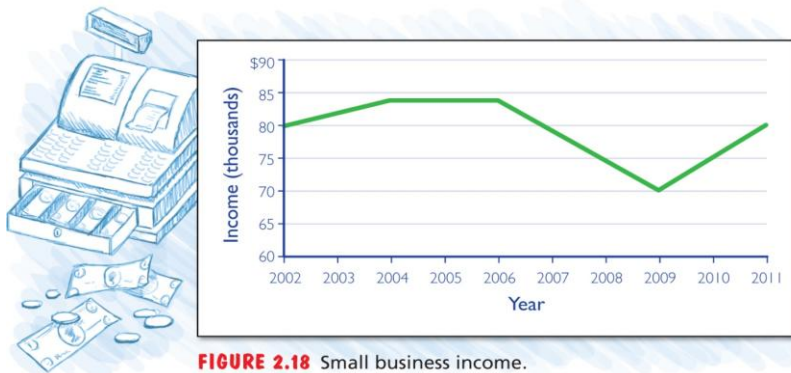
Now you try using your graphing calculator input the following data (which indicates the height of a sunflower as a function of its age.

Age (days)	Height (cm)
5	17.43
35	100.88
41	128.68
61	209.84
70	231.23

Interpreting graphs: Look at how the data **Represents** maximums and **Minimums**



- ▶ **Example:** The line graph in Figure 2.18 shows the yearly gross income in thousands of dollars for a small business from 2002 through 2011. Explain what this graph says about the rate of growth of yearly income.



The Rate of Growth of Yearly Income was positive from the years 2002 -- 2004, then the rate was zero for the years 2004 -- 2006, Negative for 2006 -- 2009, and Positive for the years 2009 -- 2011

Key concept-smoothed line graphs are made from a Scatterplot by joining data points smoothly with Curves instead of line segments.

Try an example yourself

- ▶ **Example:** The graph of the amount of toxic waste remaining as a function of time is decreasing at a decreasing rate. Sketch an appropriate graph for the amount of toxic waste remaining as a function of time.



FIGURE 2.23 Toxic waste disposal from a meth lab site.

In practical settings, the growth rate has a familiar meaning.

- ▶ **Example:** The graph in Figure 2.24 shows a population that increases from a time and then begins to decrease. The growth rate in this context is the rate of population growth. The growth rate is positive in Year0. It remains positive until we reach Year3, where the growth rate is 0. Beyond Year3 the growth rate gets negative through Year5.

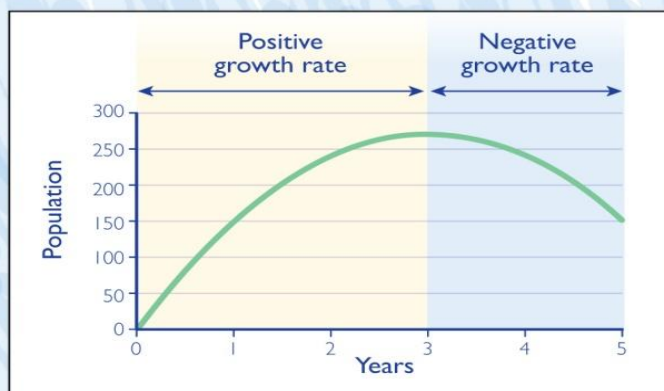


FIGURE 2.24 A population graph.