The concepts of **population**, **population growth, per-capital growth, and density dependent growth** are more difficult that they may first seem. To reinforce these ideas, we want you to find some "population" of your own your own choosing, define it clearly for us, and quantify some patterns of growth in this population.

For class, we have defined population as "a group of (interbreeding) individuals found in the same space or area at the same time". But, for the purposes of this lab, we want you to use a much looser definition of population as an aggregation of virtually anything that can be counted as units and grows or changes in size. So, for example (and now you can't use this example), you could just sit outside of the Biology advising office at 8 AM one morning. If the office opens with two advisors already there, then we can count the numbers of students that enter and leave in some reasonable intervals, such as 5 minutes. We can use this to determine how many people are in our "population" at any given time, based on the difference between the numbers that left entered and left, shown in the table below.

minutes	pop_size	pop_change	per_capita
0	2	1	0.50
5	3	2	0.67
10	5	7	1.40
15	12	1	0.08
20	13	2	0.15
25	15	1	0.07
30	16	1	0.06
35	17	3	0.18
40	20	0	0.00
45	20	-4	-0.20
50	16	-1	-0.06
55	15	1	0.07
60	16	--	--

Notice that we have created some extra columns – this is particularly easy in Excel. The "pop_change" shows how much the population changes between time intervals. This is the population growth rate per five minutes. Then, we also determined the per-capita growth rate, by dividing the population growth rate by the size of the population at that time.

We want you to find your own "population" and collect the same type of data. A population could consist of leaves on a growing seedling, or the area covered by mold growing on bread, or fruit flies in your kitchen. Use your imagination. If you want to be sure that your "population" is OK for the class, check with Dr. Miller or Maggie Vogel.

We then want you to make three graphs with your data, and answer the questions below. The graphs are:

• Population Size vs. Time
• Population Growth Rate vs. Time
• Per-capita growth rate vs. Population Size

Below are the graphs from our data on students in the advising office:
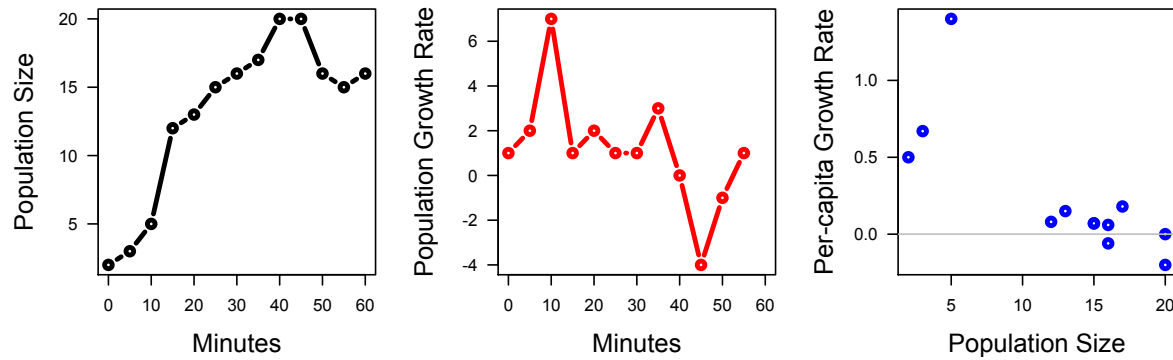
There are a few guidelines:

- Because we want to see growth, you need to start with some low number of individuals in your population.
- You need population sizes from at least 10 time intervals.
- Don't use humans, as in the example. Be more creative.
- Do your own work! Each student needs his own population

After you have made your graphs, answer the following questions:

(1) Define your population in words, sufficient so that someone else could find a similar population. Include a table like the one shown above, with your raw data and analyses.

(2) Describe the pattern of growth through time from your graphs and attempt to explain its causes (the graph of per-capita growth rate as a function of density might be very useful here). For example, does your population continue to grow during the entire time of your observations? Do you think it will continue to grow? Why or why not?

(3) Is there any indication that your population is self-limiting (density-dependent growth)? Explain your evidence for or against self-limitation.