Investigation #1:   Analyzing data from two-way tables

Example #1: I pod ownership

 At a very large local high school in 2005, David wondered whether students at his local school were more likely to own an i-pod than teachers. To answer his question, he conducted a conducted a **survey** about i-pod ownership. To get his data, he went to the lunch area, and asked a **sample** of seniors and a **sample** of teachers to participate in his survey.

a) **: Make a prediction:** Do you think that the **population** of *all* seniors at the school were more likely, less likely, or equally likely to own an Ipod than the population of *all* teachers in 2005? Why or Why not?

Let's use David's data to answer this question. David left out some information.

	Teachers	Students	Total
Owns an i-pod	18	60	78
Doesn't own an i-pod	12		45
Total	30		

b)   Fill in the missing information in the table.
c)   What percentage of the surveyed teachers owned an Ipod? What percentage of surveyed teachers did *not* own an Ipod?

d)   Compute the same percentages for students in the survey, and express your answers in sentences.

e) To compare the ownership rates of the two groups with a visual display, create a *segmented bar graph.* The bar for seniors has already been created. Create an appropriate bar for the non-seniors.
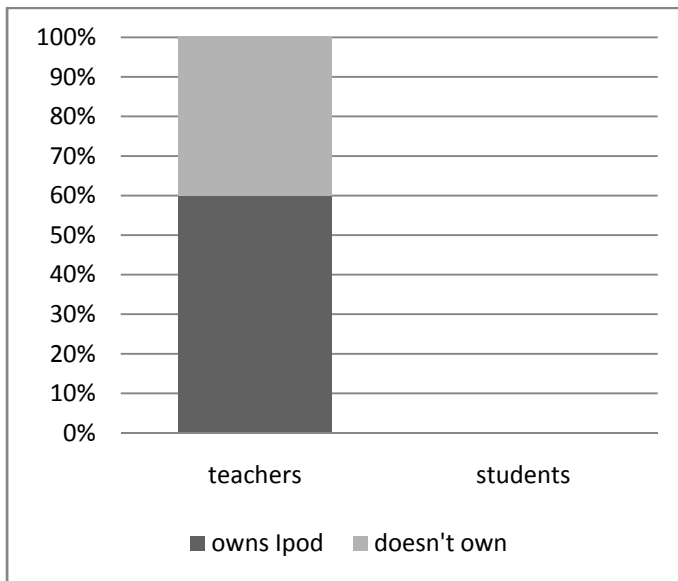
f) Write a sentence for the *Chronicle* which compares the I-pod ownership rates for the two **samples**.

g) Based on the results of these samples, which conclusion would you make regarding the following statement?
"If all students and all students at the school were surveyed, we'd that the IPod ownership rate for students would be higher for students than for teachers."

- Definitely agree
- Probably agree
- Too close to call
- Probably disagree
- Definitely disagree

h) How could you become *more* confident of your decision in part g? Name a couple of ways.

i) This survey was done in 2005. If the survey were done today, would you expect the same results about ownership rates? Explain.

Problem #2:   Left-Eyed and Right eyed-ness

When you pick up a pencil or pen and write, what hand do you typically use?

People are also left-eye dominant or right-eye dominant.   Which one are you?   Here's how to find out:

Hold your hands in front of you like the picture. Find an object about 10-15 feet away. Make a space to look through. Now, close your right eye. Can you still see it? If so, then you are left-eye dominant. If you can't see the object, open your right eye and close your left eye. Can you see it? If so, then you are right-eye dominant.

A sample of 100 students at a local high school were studied, and the following two-way table was created from the results.   Using the table below, create an appropriate segmented bar chart for each of the following questions:

	Left Handed	Right Handed	Total
Left Eyed	13	28	41
Right Eyed	4	55	59
Total	17	83	100

Using the two-way table above, create an appropriate segmented bar chart for each of the following questions:
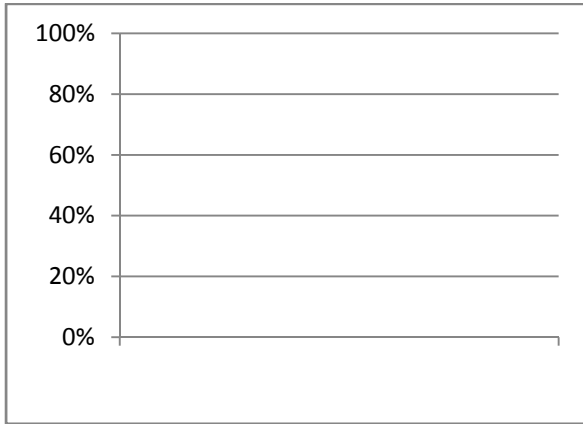
a)   Which is more likely: Being left-eyed or being left-handed?
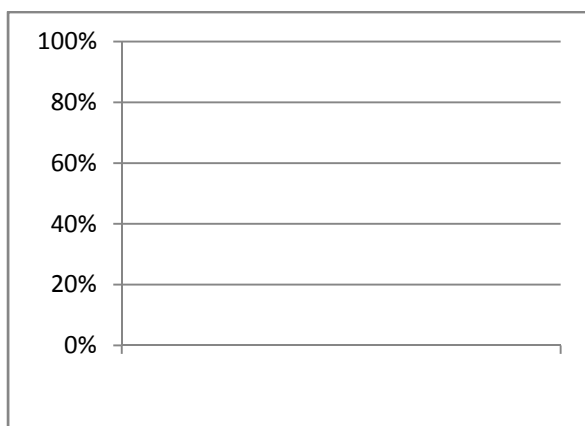
b) Are left-handed students more likely, less likely or equally likely to be left-eyed than right handed students?

100%
80%
60%
40%
20%
0%

c) Are left-handed people more likely or less likely to have matching hand/eye dominance than right-handed people?

100%
80%
60%
40%
20%
0%

Example 3: Cell Phones

There's a stereotype in that everybody in LA has a cell phone. A researcher decided to collect data to determine if LA people were indeed more likely to own cell phones than other Californians. The two-way table and two different bar graphs were created.

	From Los Angeles	From somewhere else in CA	Total
Owns a cell phone	164	386	550
Does not own a cell phone	43	407	450
Total	207	793	1000
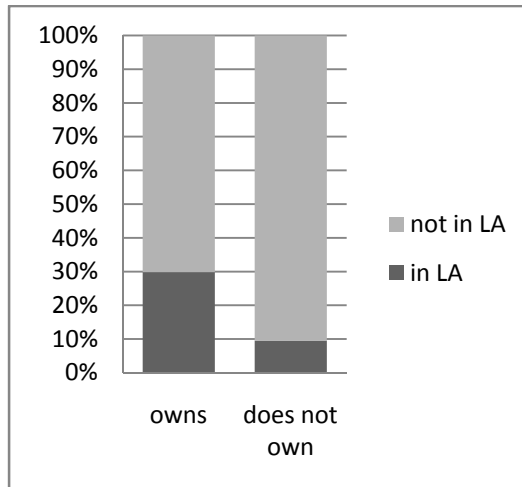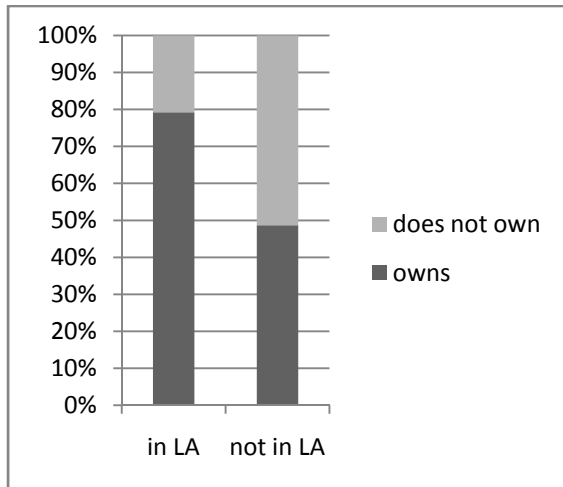
a) Which plot makes it **easier** to answer the question "Are LA people more likely to own a cell phone than other Californians?" Why?

b) What does the **other** segmented bar graph tell you? Write a sentence or two based on the other graph.

Example 4: University grades

A random sample of 1000 students at a large university was studied. We recorded their gender and the grade they earned on a standardized test in mathematics.

	Males	Females	Total
Got an A or B	227	457	
Got C or below			
Total	407		1000

a)   Fill in the missing information in the data table.

b)   What percentage of the survey participants got an A or B, regardless of gender**?**

c)   This test was given only to a sample of 1000 students at this large university. Suppose the test were given to *every* male and every female at the university. Based only on the results of this study, do you think that we'd see a difference in the "A or B" rates of students between all males and all females? **Create and refer to an appropriately labeled segmented bar graph to support your conclusion.**
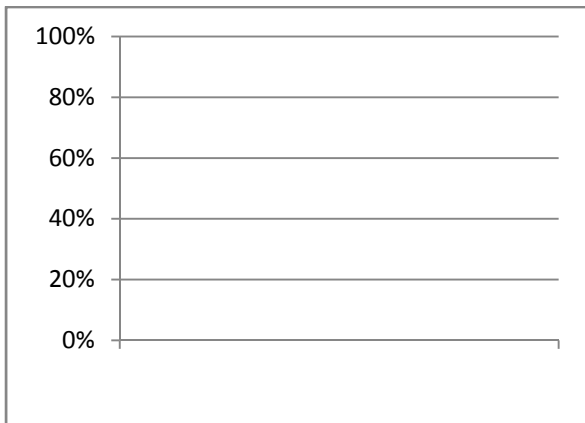
Problem #5: Cholesterol

A recent study was conducted to answer the question, "Are people with high cholesterol more likely to develop heart disease than people with normal cholesterol?" A random sample of adults in the US was studied to answer this question. Doctors assessed subjects' cholesterol level (normal or high), and whether they had signs of heart disease (showed signs, did not show signs).

	High Cholesterol	Normal Cholesterol	**Total**
Showed signs of heart disease	227	157	
Did not show signs of heart disease	630	850	
Total			

Write a short article for a local newspaper, that answers this question. Provide **A segmented bar graph** and numerical evidence (percentages) in your article.
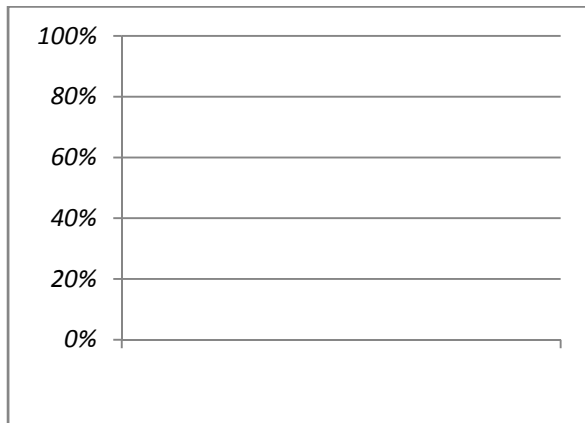
Problem 6: Flu Vaccines

In 2003, Centers for Disease Control (CDC) published a study that looked at works at Children's Hospital in Denver, CO.   Of the 1000 people who received a flu vaccine before November 1, 149 still developed flu-like illness. Of the 402 people who did not get the flu vaccine, 68 got a flu-like illness.

   a)   Create a two-way table (got vaccine / didn't get vaccine   vs. got flu /didn't get flu) to summarize the results of this study.

   b)   Create a segmented bar graph and a write a paragraph appropriate for a newspaper to describe the results of the study.
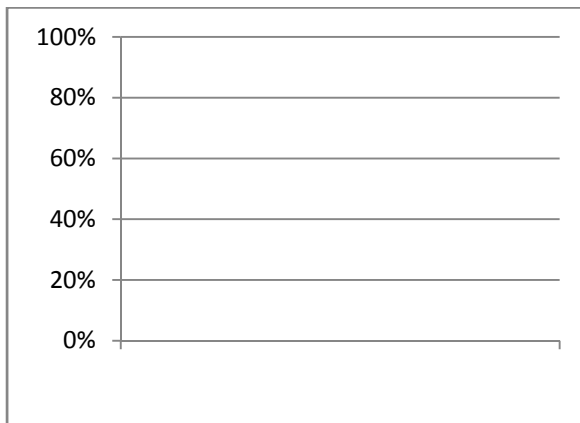
   c)   Is there sufficient evidence that the vaccine helped reduce the occurrence of developing flu-like illness? Provide evidence / reasoning for your conclusions.