For this lab, each student will do an independent investigation. You will set up and carry out your own research project, using scientific method, and write a report on your findings. The project must produce data that can be presented as a graph, and must involve observation or measurement of living organisms (remember, this is a biology class). Design your project to answer a question or test a hypothesis. Keep your project simple and manageable. It should take no more than three hours to complete, not including writeup. The completed lab report will count as a quiz grade.

You may not do a project involving any dangerous or inadvisable activity, such as studying the effects of alcohol on the human body, nor may you do a project that harms any animal. You may select a project from those listed, or devise your own. If you make up your own project, you write up a brief proposal and get your lab instructor’s approval for it.

Some examples of projects that would be acceptable:

1. Correlate leaf size to tree height. Compare trees of the same species (oaks and tulip poplars are good choices). Use several trees of different heights, including very small ones. Measure area or dimensions of several leaves from each tree. You may have to estimate tree heights.

2. Correlate tombstone age with amount of lichen growing on it. Measure the amount of lichen and assume the stone was put in place the year the person died. Determine if any other factors could affect amount of lichen.

3. Determine if crickets chirp more at certain times of day. Male crickets can be obtained from a pet store, maintained in a secure container with a wet sponge or paper towel, and fed dog food, fruit or bread. Record what times of day the crickets chirp. Determine if artificially altering their photoperiod will change chirping times.

4. Determine whether smoking affects cardiovascular health. Have at least three people in each category (nonsmoker, light smoker, heavy smoker) perform the same exercise and compare their resting heart rate to rate after the exercise. A smaller increase indicates better cardiovascular health. This experiment could also be done using age, not smoking, as the dependent variable.

5. Determine whether butterflies are more active on sunny than on cloudy days. You will need access to a garden, field or other place where butterflies will be found. Be sure to make all observations at the same time of day.

6. Correlate acorn size with oak tree size (weigh or measure the acorns).

7. Correlate the size of winged seeds (as from maple or ash trees) travel with distance they travel when dropped from the same height. Use at least three different size categories and at least ten seeds in each category.

8. Determine whether amount of curl in rhododendron leaves correlates with temperature. For this you will need to figure out a way to measure the curl, measure several leaves on each of several plants, and do it at at least five different temperatures.

9. Determine if there is a correlation between time of day and the number of birds at a bird feeder. Make observations at at least five different times of day (you don’t have to observe the feeder constantly all day) on several different days. You could also
Determine if certain bird species prefer some times of day to others. Be sure you keep the feeder filled!

Determine if human body temperature changes during the day. Use at least three people and take an average for each time of day.

Determine if size of a dog affects how long it lives. Ask among family, friends and classmates for the ages and weights of dogs that died naturally. The larger the sample size, the better.

Be sure to keep a detailed record of the experimental procedures and your results. Illustrations of your experiment, subjects, work in progress, etc., can be included. Even if your results are inconclusive or don’t support your hypothesis, you can still write a perfectly acceptable lab report, so don’t try to fudge or fake your data. Iffy results provide a great opportunity to discuss possible reasons for the results, ways the experiment could be improved, etc.

There are instructions for writing a lab report in the appendix of your lab manual. Use complete sentences and watch your grammar. Your report must be word-processed or typed, not handwritten, and your results must be presented as a graph. The graph can be made using Microsoft Excel or another program. It’s very desirable to look up some background information on the topic, to include in your introduction, and if you do so you must cite your source(s). You need not include report covers or cover sheets. Save a tree--just put your name on the first page.

The following criteria will be used to determine your grade: scientific rigor, amount of effort, sample size, thoroughness, originality and proper format of the report.

Note: You must do a different project for Bio 102 than you did for 101!