

**A.P. Statistics**  
**Assignment 3.8**

**Remember to show your thinking through your work.**

- 1) For each of the following situations, identify the experimental units (or subjects), the factor(s), the treatment (s) and the response variable.
- a) The ability for pine trees to grow in the shade may help them to thrive in drought conditions. How well do pine trees grow in the shade? Researchers plant small pine trees in a greenhouse in either full sunlight or in sunlight that has been reduced by 10% (through using a shade). At the end of the experiment, they weighed each of the trees.

- b) A manufacturer of food products uses heat to seal their food inside of plastic bags. The manufacturer is curious about the effect of the temperature on the strength of the seal. Researchers seal 20 plastic bags at 220 degrees Fahrenheit, 20 plastic bags at 240 degrees Fahrenheit, 20 plastic bags at 260 degrees Fahrenheit, 20 plastic bags at 280 degrees Fahrenheit, and 20 plastic bags at 300 degrees Fahrenheit. They then test the strength of the bags.

- 2) Many years ago, some doctors administered medication to the patients themselves, as opposed to using a pharmacist. One curious yet unethical doctor decided to start giving all his patients sugar pills in place of the actual medication. To his surprise, many of his patients actually had their symptoms vanish despite not getting the actual medication. Explain how this might happen.

- 3) A professor wants to determine whether performance in a statistics class can be influenced by the expectation of success. He will be teaching 9 sections of statistics over the next two years. He wants to tell the students in some sections that “females perform better in statistics than males.” In some other sections, he wants to say, “males perform better in statistics than females.” Design an experiment that uses both treatment groups and control groups.

- 4) Do SAT prep courses really help improve your test results? Design an experiment to answer this question. Suppose you have 200 subjects to work with.

