Test Your Understanding 8

Suppose you want to estimate the average amount spent by first term sophomores at WPI for textbooks, and that you can interview 10 students for your study.

(a) If you believe the distribution of the amounts spent for textbooks is pretty consistent across all students, how might you choose the 10 students? Why?

(b) If you believe that textbook expenses for engineering students are substantially higher than for other majors, how might you choose the 10 students? Why?

(c) If you want to be certain to obtain an estimate for humanities majors, as well as other majors, how might you choose the 10 students? Why?
Test Your Understanding 9

To compare the efficacy of mosquito repellent, volunteers have an arm coated with a prescribed amount of the product. The arm is then inserted into a chamber filled with mosquitoes for a fixed amount of time and the number of bites counted (YUCK!). To compare the efficacies of two different repellants, volunteers are randomly divided into two groups. One group is given repellant 1 and the other repellant 2 and the test described above is conducted for each.

1. Is this a controlled experiment? Why?

2. If it is a controlled experiment, describe the
   (a) Experimental units
   (b) Response
   (c) Experimental factor(s)
   (d) Possible nuisance factors
   (e) Factor levels
   (f) Treatments
   (g) Effect
Test Your Understanding 10

Recall the experiment described in TYU 9:

To compare the efficacy of mosquito repellant, volunteers have an arm coated with a prescribed amount of the product. The arm is then inserted into a chamber filled with mosquitoes for a fixed amount of time and the number of bites counted (YUCK!). To compare the efficacies of two different repellants, volunteers are randomly divided into two groups. One group is given repellant 1 and the other repellant 2 and the test described above is conducted for each.

How could blocking be used to improve the design?
Test Your Understanding 11

In order to identify risk factors for juvenile criminal behavior, researchers compared a large group of juvenile offenders with a group of their peers who were not offenders. These groups were compared with respect to a large number of factors.

1. What kind of a study is this? Be as specific as you can.

2. Suppose the researchers find a number of factors that are quite different for the two groups. Do you think the researchers can conclude these factors cause juvenile crime? Explain.