Chapter 1: Statistics and the Scientific Method

1.1 a. The population of interest is the weight of shrimp maintained on the specific diet for a period of 6 months.

b. The sample is the 100 shrimp selected from the pond and maintained on the specific diet for a period of 6 months.

c. The weight gain of the shrimp over 6 months.

d. Since the sample is only a small proportion of the whole population, it is necessary to evaluate what the mean weight may be for any other randomly selected 100 shrimps.

1.2 a. The amount of radioactivity at all points in the suspect area.

b. The 200 randomly selected points in the suspect area.

c. The level of radioactivity in the suspect area.

d. We want to relate the level of radioactivity of the 200 points in the sample to the level in whole suspect area. Thus we need to know how accurate a protrayal of the population is provided by the 200 points in the sample.

1.3 a. All households in the city that receive welfare support.

b. The 400 households selected from the city welfare rolls.

c. The number of children per household for those households in the city which receive welfare.

d. In order to evaluate how closely the sample of 400 households matches the number of children in all households in the city receiving welfare.

1.5 a. All football helmets produced by the five companies over a given period of time.

b. The 540 helmets selected from the output of the five companies.

c. The amount of shock transmitted to the neck when the helmet's face mask is twisted.

d. The neck strength of players is extremely variable for high school players. Hence, the amount of damage to the neck varies considerably from player to player for exactly the same amount of shock transmitted by the helmet.

1.6 a. The 35,000 students enrolled in the university.

b. The 500 students selected by the faculty.

c. First a list of all 35,000 students would be constructed. Using a computer program, generate 500 random numbers between 1 and 35,000. The students corresponding to these 500 numbers on the list will be the students to whom questionaires will be sent.

d. The questions should determine what impact this change may have on the students' professional development if the change would encourage students to work harder when they knew their grade was on the margin between two grades, and similar questions concerning whether or not the students felt the change would have a true impact on students learning experience.