Lesson 1: Data and Variability

Overview: The goal of the first lesson is to help students see that there are different types of data and different ways to aggregate and display data. This lesson also helps students to see the importance of context and how statistics differs from mathematics with an emphasis on context.

Student Goals for the Lesson:

1. To get started with the statistical process of gathering and interpreting data.

2. To see that there are different types of data and that data vary.

3. To see and consider different sources of variability in data.

4. To develop a survey to use to gather data for future activities (student survey).

5. To see that statistics is different from mathematics and that context of the data is important.

Handouts:

1. Meet and Greet
2. Developing a Class Survey

Note: Because answers will vary a lot for the activities covered in this lesson, there are no accompanying annotated student handouts (with answers).

Other Materials/Resources Needed:

1. Index cards with questions written on them and tape (for **Variables on Backs** activity)

1. Opening Discussion/Questions:

Welcome to statistics!

What kinds of students enroll in this class? How do we find out?

Ask students why they are in this course and give them the following options to see a hand count:

◊   Because it is required for your major

◊   Because you need this to fulfill a college math requirement
◊   Because you heard it was a good course
◊   Because you want to learn statistics

Discuss informally many important statistical ideas, such as methods for data recording, types of variables, and types of data, and variation in data, question wording, data summaries and representations, sample of data, whether a sample can represent the population, sample size, bias, and the sampling processes.

2. Activity 1: Meet and Greet

Collect data from 5 other students in the course (Be sure to write it down.) Introduce yourself by shaking hands and sharing the following 5 pieces of data.

- Name
- Number of credits that you are taking this semester
- Field of Study
- Your reaction to the word "Statistics"
- Are you a senior?

3. Whole Class Discussion:
◊   How did you record the data? Was there an organization?
◊   What is a good way to organize these data?
◊   What types of variables did we collect?
◊   What can we say about the class by looking at the data you recorded, just looking at the paper in front of you?
◊   How well does your sample represent the whole class?

◊   This is a statistics class, not a math class. How are they different?

4. Activity 2: Developing a Class Survey

5. Activity 3: Variables on Backs

For this activity, the instructor should tape an index card with a question on it to each student's back.   Each student will then walk around the room and record (on a piece of paper) the numerical answers to the question as told to him or her by other students in class. Each student should attempt to obtain as many responses as possible. Then, each student creates a graph of the responses. Each student should also try to guess what the question was based on the responses he or she obtained and record this guess on his or her graph. When all graphs have been created, students take turns describing their graphs and explaining their guesses, before they turn around and discover the question that was actually on their back.

At the beginning of this activity, students should be cautioned to only give a number as their answer. They should not use units (e.g., dollars, miles, etc.) and they should try not to give any reaction that would "give the question away." Students should be told that for many questions they may need to provide a guess of the answer and that "your" in a question refers to them and not to the person whose back contains the question.

The questions should be chosen as likely to interest the students involves. A mixture of questions likely to produce little variation and questions likely to generate lots of variation is desirable. It is also useful to use some questions with a single correct answer and others with opinions or tastes as answers. Here are some sample questions:

- How many dwarfs does Snow White meet?
- How many pets do you have?
- How many credits are you currently taking?
- How many miles is your home campus?
- How many years has it been since John F. Kennedy was shot?
- How many points did Michael Jordan score on average per basketball game in his career?
- What do you consider the ideal temperature in degrees Fahrenheit?
- How many people live in your household?
- How many miles is the earth from the sun?
- What is the population of California?
- What is the U.S. minimum wage in dollars?
- Pick a "random" number between 1 and 10.
- How many miles are on your car's odometer?
- How many siblings do you have?
- What is the most money (in dollars) you ever paid for watching a movie?
- What is the most money (in dollars) you ever paid for a haircut?
- How many years old is President Bush?
- What is the last digit of your telephone number?
- What is the first digit of your telephone number (without the area code)?
- How many hours of sleep did you get last night?
- How many days are in the month that you were born in?
- What is the last digit of your zip code?
- How many pairs of shoes do you own?
- What is the median age of the people in this room?
- On a scale of 1 – 10 (1 = very nervous, 10 = not nervous at all), how nervous are you about this course?
- How many Harry Potter books have you read?
- How many major league baseball teams are there in the U.S.?

Wrap-up:

References

Meet and Greet, Developing a Class Survey:

Garfield, J., Zieffler, A., & Lane-Getaz, S. (2005). EPSY 3264 Course Packet, University of Minnesota, Minneapolis, MN.

Variables on Backs:

Rossman, A., & Chance, B. (2004). *INsight into Statistical Practice, Instruction and REasoning (INSPIRE) 2004 workshop online materials*. Retrieved December 6, 2006, from http://statweb.calpoly.edu/chance/inspire/