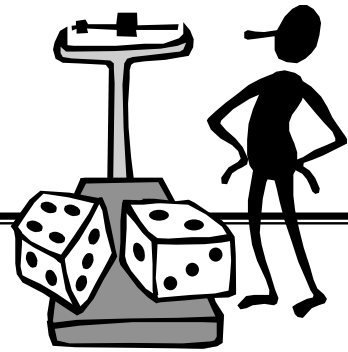# Chapter 11: Understanding Randomness

Key Vocabulary:

- random behavior
- random numbers
- pseudorandom numbers
- simulation
- component
- outcome
- trial

Calculator Skills:

- randInt(

1. What is meant by *random* behavior?

2. What is the purpose of a *simulation*?

3. What are the steps for conducting a *simulation*?

4. What is meant by a *trial*?

5. Why is it necessary to conduct a large number of *trials*?
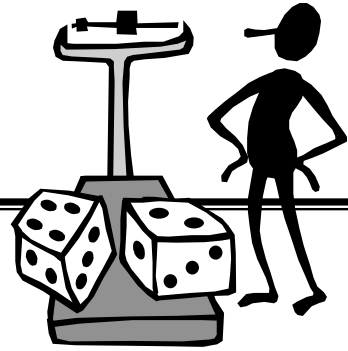
Chapter 12: Sample Surveys

Key Vocabulary:

- population
- sample
- sample survey
- biased
- randomization
- census
- parameter
- statistic
- Simple Random Sample (SRS)

- sampling frame
- sampling variability
- homogeneous groups
- heterogeneous groups
- strata
- stratified random sample
- cluster sampling
- multistage sampling
- systematic sampling
- respondents

- voluntary response sample
- convenience sampling
- undercoverage
- nonresponse bias
- response bias

1. Explain the difference between a *population*, a *sampling frame*, and a *sample*.

2. What does it mean for a sample to be *representative* of a *population*?

3. What is meant by a *biased* sample?

4. What is the role of *randomization* in selecting a sample?

5. What is meant by a *census*? Why is a *census* often impractical?

6. Explain the difference between a *parameter* and a *statistic*.

7. A *Simple Random Sample* (SRS) must satisfy what two conditions?

8. What is meant by *sampling variability*?

9.   When is *stratified random sampling* useful?

10. When is *cluster sampling* useful?

11. What is meant by a *multistage sampling*?

12. When is *systematic sampling* appropriate?

13. In what way are *voluntary response samples* often *biased*?

14. Why is *convenience sampling* unreliable?

15. What is meant by *undercoverage*? Give an example.

16. Explain the difference between *nonresponse bias* and *response bias*.

17. How can the wording of questions cause bias in a survey?
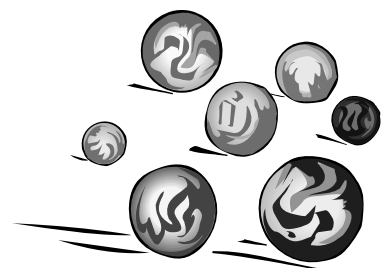
Chapter 13: Experiments

Key Vocabulary:

- observational study
- retrospective study
- prospective study
- experiment
- random assignment
- subjects
- participants
- experimental units
- factors

- levels
- treatment
- block
- completely randomized experiment
- statistically significant
- control
- control group
- single-blind

- double-blind
- placebo
- placebo effect
- matching
- confounding

1. Explain the difference between an *observational study* and an *experiment*.

2. Explain the difference between *experimental units* and *subjects*.

3. Why is it necessary to assign *subjects* to *treatments* at random?

4. Describe the four *Principles of Experimental Design*.

   - *Control*

   - *Randomization*

   - *Replication*

   - *Blocking*

5. Explain what is meant by a *control group*.

6. Define *statistically significant*.

7. What is the purpose of using a *single-blind* or *double-blind experiment*?

8. What is a *placebo*? What is meant by the *placebo effect*?

9. What is the purpose of using *blocking* in an *experiment*?

10. How might *confounding* affect the results of an *experiment*?