Chapter 11

17. Cereal. Answers will vary. A component is the simulation of the picture in one box of cereal. One possible way to model this component is to generate random digits 0- 9. Let 0 and 1 represent Sidney Crosby, 2-4 represent David Beckham, and 5-9 represent Serena Williams. Each trial will consist of 5 random digits, and the response variable will be whether or not a complete set of pictures is simulated. Trials in which at least one of each picture is simulated will be a success. The total number of successes divided by the total number of trials will be the simulated probability of ending up with a complete set of pictures. According to the simulation, the probability of getting a complete set of pictures is expected to be about 51.5%.

18. Cereal, again. Answers will vary. A component is the simulation of the picture in one box of cereal. One possible way to model this component is to generate random digits 0-9. Let 0 and 1 represent Sidney Crosby, 2-4 represent David Beckham, and 5-9 represent Serena Williams. Each trial will consist of generating random numbers until a 0 or 1 is generated. The response variable will be the number of digits generated until the first 0 or 1. The total number of digits generated divided by the total number of trials will be the simulated average number of boxes required to get a Sidney Crosby picture. According to the simulation, in order to be reasonably assured of getting a Sidney Crosby's picture, expect to buy about 5 boxes.

35. The Stanley Cup final. Answers may vary. Each game is a component. One way of modelling this component is to generate pairs of random digits 00-99. Let 01-55 represent a win by the favoured team, and let 56-99 and 00 represent a win by the underdog. A trial consists of generating pairs until one team has 4 simulated wins. The response variable is whether or not the underdog wins. The simulated percentage of Stanley Cup wins is the total number of successes divided by the total number of trials. According to simulation, the underdog is expected to win the Stanley Cup about 39% of the time.

Chapter 13

39. Mozart.
a) The differences in spatial reasoning scores between the students listening to Mozart and the students sitting quietly were more than would have been expected from ordinary sampling variation.
b) Tree diagram
c) The Mozart group seems to have the smallest median difference in spatial reasoning test score and thus the *least* improvement, but there does not appear to be a significant difference.

d) No, the results do not prove that listening to Mozart is beneficial. If anything, there was generally less improvement. The difference does not seem significant compared with the usual

variation one would expect between the three groups. Even if type of music has no effect on test score, we would expect some variation between the groups.

50. Shingles.
a) Answers may vary. This experiment has 1 factor (ointment), at 2 levels (current and new), resulting in 2 treatments. The response variables are the improvements in severity of the case of shingles and the improvements in the pain levels of the patients. Randomly assign the eight patients to either the current ointment or to the new ointment. Before beginning treatment, have doctors assess the severity of the case of shingles for each patient, and ask patients to rate their pain levels. Administer the ointments for a prescribed time, and then have doctors reassess the severity of the case of shingles, and ask patients to once again rate their pain levels. If neither the patients nor the doctors are told which treatment is given to each patient, the experiment will be double-blind. Compare the improvement levels for each group.

b) Answers may vary. Let numbers 1 through 8 correspond to letter A through H, respectively. Ignore digits 0 and 9, and ignore repeats. The first row contains the random digits, the second row shows the corresponding patient (X indicates an ignored or repeated digit), and the third row shows the resulting group assignment.
Group 1 (current ointment): D, A, H, C
Group 2 (new ointment): B, G, E, F

c) Assuming that the ointments look alike, it would be possible to blind the experiment for the patient and the evaluating doctor. If both the subject and the evaluator are blinded, the experiment is double-blind. d) Before randomly assigning patients to treatments, identify them as male or female. Having blocks for males and females will eliminate variation in improvement due to gender.