5.43 The second design is an experiment—a treatment is imposed on the subjects. The first is an observational study; it may be confounded by the types of men in each group. In spite of the researcher’s attempt to match “similar” men from each group, those in the first group (who exercise) could somehow be different from men in the non-exercising group.

5.44 (a) A diagram is shown below. (b) If we assign labels 01, ..., 18 and begin on line 142, then we select: 02, 08, 17, 10, 05, and 09 for Group 1; 06, 16, 01, 07, 18, and 15 for Group 2. The remaining rats are assigned to the placebo group.

5.46 (a) If only the new drug is administered, and the subjects are then interviewed, their responses will not be useful, because there will be nothing to compare them to: How much “pain relief” does one expect to experience? (b) Randomly assign 20 patients to each of three groups: Group 1, the placebo group; Group 2, the aspirin group; and Group 3, which will receive the new medication. After treating the patients, ask them how much pain relief they experienced, and then compare the average pain relief experienced by each group. (c) The subjects should certainly not know what drug they are getting—a patient told that she is receiving a placebo, for example, will probably not experience any pain relief. (d) Yes—presumably, the researchers would like to conclude that the new medication is better than aspirin. If it is not double-blind, the interviewers may subtly influence the responses of the subjects.

5.47 (a) Ordered by increasing weight, the five blocks are (1) Williams-22, Deng-24, Hernandez-25, and Moses-25; (2) Santiago-27, Kendall-28, Mann-28, and Smith-29; (3) Brunk-30, Obrach-30, Rodriguez-30, and Loren-32; (4) Jackson-33, Stahl-33, Brown-34, and Cruz-34; (5) Birnbaum-35, Tran-35, Nevesky-39, and Wilansky-42. (b) The exact randomization will vary with the starting line in Table B. Different methods are possible; perhaps the simplest is to number the subjects from 1 to 4 within each block, then assign the members of block 1 to a weight-loss treatment, then assign block 2, etc. For example, starting on line 133, we assign 4-Moses to treatment A, 1-Williams to B, and 3-Hernandez to C (so that 2-Deng gets treatment D), then carry on for block 2, etc.

5.49 (a) Randomly assign 10 subjects to Group 1 (the 70° group) and the other 10 to Group 2 (which will perform the task in the 90° condition). Record the number of correct insertions in each group. (b) All subjects will perform the task twice; once in each temperature condition. Randomly choose which temperature each subject works in first by flipping a coin.