1. A pharmaceutical company has developed a new pain-relief medication for arthritis. Sixty patients suffering from arthritis and needing pain relief are available. Each patient will be treated and asked an hour later, “About what percentage of your pain has gone away?”

   a. Why should this company not simply administer the new drug and record the patients’ responses?

   Without a control group in an experiment, researchers would not have known if the new medication really worked even if patients would claim pain relief. All good experiments contain controls.

   b. Outline the design of an experiment to compare the drug’s effectiveness with that of aspirin and of a placebo.

   ![Experiment Design Diagram]

   c. Should patients be told which drug they are receiving? How would this knowledge probably affect their reaction?

   No, it would probably affect their reaction. Blind experiment would prevent research outcomes from being influenced by the placebo effect.

   d. Should this experiment be double-blinded also? Explain.

   It’s a good idea. Double-blinding would prevent research outcomes from being influenced by either the placebo effect or the observer bias.
2. You are participating in the design of a medical experiment to investigate whether a calcium supplement in the diet will reduce the blood pressure of middle-aged men with high blood pressure. You have 40 men with high blood pressure who are willing to serve as subjects.

a. Use a diagram to outline an appropriate experiment.

```
40 patients
  Random assignment
  20 patients: diet with calcium supplement
  20 patients: regular diet
  Compare blood pressure
```

b. Preliminary work suggests that calcium may be effective and that the effect may be greater for black men than for white men. Use a diagram to outline an appropriate experiment. Explain where you use randomization in this design.

```
40 patients
  Black patients
    Random assignment
    Half of the patients: diet with calcium supplement
    Compare blood pressure
  White patients
    Random assignment
    Half of the patients: diet with calcium supplement
    Compare blood pressure
    Half of the patients: regular diet
    Compare blood pressure
```
3. An expert on worker performance is interested in the effect of room temperature on the performance of tasks requiring the use of both hands simultaneously. Twenty subjects are available.

a. Outline a design to compare performance at 70° and 80°.

b. Because individuals differ greatly in performance, the wide variation in individual scores may hide the systematic effect of temperature unless there are many subjects in each group. Describe in detail the design of a matched pairs experiment in which each subject serves as his or her own control. Explain where you use randomization in this design.

Each worker would perform the tasks at 70°, and 80°. We would assign randomly which temperature setting would be the first one to perform at. Then we would compare performance for each worker.