1. Use Figure 5-17 in the textbook to explain why it is safe to lie on a bed of nails but it is not safe to stand barefoot on the same bed of nails.

2. A 150-pound runner completes a 26.2-mile marathon in 4 hours. She burns about 480 KJ per mile during her race (above her normal metabolic energy consumption).
   a) Calculate her total energy consumption for the race in Joules.
   b) Convert this total energy to kilocalories (you will need to look up the conversion factor).
   c) Calculate her average power consumption in Watts. Compare this with power consumption of a typical blow dryer (you will need to look this up).
   d) The “Calories” on food nutrition labels are actually kilocalories. Estimate the amount of peanut butter equivalent to her marathon energy expenditure.
   e) Use \( W = Fd \) to calculate the equivalent average force she applied during her marathon.
   f) What fraction of her weight (in Newtons!) is this average force?

3. The energy balance for an athlete can be described by the equation:

   \[
   \text{change in stored energy} = \text{chemical energy} - \text{mechanical work} - \text{heat dissipation}
   \]

Identify which term in the equation best matches each of these activities:
   a) eating.
   b) sweating.
   c) swimming.
   d) losing weight.