Discussion Questions and Practice Problems for Heat and Calorimetry

1. When heat flows from a warm object in contact with a cool object, do both objects undergo the same amount of temperature change?
2. If you vigorously shake a can of chicken broth back and forth for more than a minute, will the temperature of the broth increase?
3. Why does a hot dog pant?
4. Why is cold ice “sticky”?
5. Alcohol evaporates more quickly than water at the same temperature. Which produces more cooling—alcohol or the same amount of water on our skin?
6. Can you give two reasons why pouring a cup of hot coffee into a saucer results in faster cooling?
7. Why will wrapping a bottle in a wet cloth at a picnic often produce a cooler bottle than placing the bottle in a bucket of cold water?
8. Two cities, one near a large lake and the other in the desert, both reach the same high temperature during the day. Which city, if either, would you expect to cool down more rapidly once the sun has set?

Problems:

1. How much heat is required to raise the temperature of 70 g of water from 20oC to 80oC? The specific heat of water is 1.0 cal/g·oC.
2. How much heat must be removed from a 200-g block of copper to lower its temperature from 150oC to 30oC? The specific heat capacity of copper is 0.093 cal/g·oC.
3. If 600 cal of heat are added to 50 g of water initially at a temperature of 10oC, what is the final temperature of the water?