1. A large pot of water boils on the stove, heated from below by an electric heating element. The temperature of the pot stays constant at 100°C for a few hours.
   a. Describe the ways in which heat is transferred into and out of the water.
   b. How is heat transferred within the water?
   c. Is the water in thermal equilibrium? What does that mean?

2. Suppose that 500g of water vapor condense to make a cloud about the size of an average room.
   a. If we assume that the latent heat of condensation is 600 cal/g, how much heat would be released to the air?
   b. If the total mass of air before condensation is 100kg, how much warmer would the air be after condensation?
   
   Hint: you will need to refer to Table 2.1 on p. 30 and assume that the cloud is at sea level.

3. According to figure 2.16, the earth absorbs approximately 51 units of solar energy but emits 117 units of infrared radiation. What prevents the earth from getting colder and colder?

4. Describe how the surface temperature of the earth would change if a gas were added to the atmosphere which:
   a. Perfectly absorbs electromagnetic radiation at a wavelength of 0.5 μm.
   b. Perfectly absorbs radiation at 11 μm.
   c. Perfectly absorbs radiation at 20 μm.
   
   Explain your answers using figure 2.11.

5. In an ice age, temperatures cool and forests are covered with snow and ice sheets. What is the radiative effect of the snow? Is it a positive feedback or a negative feedback on the cooling which brings about the ice age?

Note: homework is due at the beginning of class on the due date. Please explain your answers and show all work.