$q = mC\Delta T$

Specific Heat of ethyl alcohol = 2.44 J/g * °C
Specific Heat of aluminum = 0.900 J/g * °C
Density of Aluminum = 2.70 g/ml

1. How many joules will be given off if a 50.0 gram sample of water is allowed to cool from 50.0 °C to 20.0 °C?

2. A hot piece of iron is put into a bucket containing 3.0 liters of water. The temperature of the water increases from 30. °C to 110 °C. How many joules were put into the bucket?

3. How many joules are needed to heat 4.00 liters of water to 70°C? The initial temperature of the water is 27.0 °C.

4. How many joules will be needed to heat a 4.00 Liters of ethyl alcohol starting from 27.0 °C to 70.0 °C?

5. Using your results from Q 3 & 4, which liquid can store more energy? Explain you answer.

6. If constant heat is applied to both liquids (from Q 3 & 4) simultaneously. Which liquid would reach 70.0 °C first? Why?

7. A 500. ml sample of water has an initial temperature of 95.0°C.   What will the final temperature be after 1500. joules of energy is removed?

8. After adding a total of 2500.joules.   A container filled with 15 liters of water reached a maximum temperature of 90.0 °C. What was the initial temperature of the water?

9. A 5 gram piece of aluminum, measuring 5.00 cm by 0.500 cm by 2.00 cm, is placed into a graduated cylinder containing 50.0 ml of water. Before entering the water the aluminum was 27.0 °C, after entering the water it was 20.0 °C. How much energy did the aluminum lose?

10. A piece of aluminum is placed into a 100 liter container. The container is then filled with water. The total mass of the aluminum is 20 kg.

    a. What is the volume of the aluminum? (Hint – D=m/v)

    b. What is the volume of the water inside the container? (Hint – subtract the volume of the aluminum)

    c. What is the mass of the water? (Hint – D=m/v)

    d. How many kilojoules will be necessary to heat the aluminum to from 20.0 $°C$ to 60.0 $°C$?

    e. How many kilojoules will be necessary to heat the water to from 20.0 $°C$ to 60.0 $°C$?

f. How many kilojoules will be necessary to heat both the water and the aluminum?