Chemistry / Environmental Studies L111 Environmental Concerns and Chemical Solutions Professor Dransfield Homework 6: Due March 15, 2007

2. While the **temperature** in the two containers is the same, the heat content is not. "Heat content" depends on both the temperature of a material and the amount of that material. Because there is twice as much mass of water in the container on the left, the heat content of that container is twice as large.

3.
$$600 \, Calories = 600 \, kcal \times \frac{4.184 \, kJ}{1 \, kcal} = 2510 \, kJ$$
;

The US candy bar provides less energy than the Swiss candy bar (by about 500 kJ). That also means that there are fewer calories (food calories that is) in the American bar than in the Swiss one.

4.

$$70 Cal = 70 kcal \times \frac{4.184 kJ}{1kcal} \times \frac{1000 J}{1kJ} \times \frac{1beat}{1J} \times \frac{1min}{80 beats} \times \frac{1hr}{60 min} \times \frac{1day}{24 hr} = 2.5 days$$

8. C_2H_6 has a mass of (2x12.01)+(6x1.008)=30.07g/mol and heat of combustion of 52.0 kJ/mol. $1mol C_2H_6 \times \frac{30.07 g C_2H_6}{1mol C_2H_6} \times \frac{52.0 kJ energy}{1g C_2H_6} = 1,564 kJ energy$

10.



- 12. a. heat is released, so exothermic.
 - b. heat is absorbed, so endothermic.
 - c. heat is absorbed, so endothermic.
 - d. heat is released, so exothermic.
- 31. a. H₂O (g)
 - b. iron powder
 - c. peanut butter

51. a. This reaction is exothermic – the products on the right hand side are lower in energy than the reactants.

