

AP Practice – Chap 2 Energy Conversions

- I. Use the conversions on page 37 in Friedland text to help you solve the following:
- How many joules (J) of energy are required to heat 75 grams of water from a temperature of 8 degrees C, to 98 degrees C?
 - How many Btu's would that be equivalent to?
 - Suppose that your breakfast consisted of a bagel (270 Calories) with a serving of cream cheese (80 Calories), and 8 oz. of orange juice (110 Calories). How many kilograms of water could be heated by one degree C?
 - Given your answer for c, how many joules of energy would that be equivalent to? How many Btu's?
 - Given your answer for d, how much power in kilowatt hours (kWh) could be generated?
- II. Use the sample problems on page 38 to help you solve the following:
- My electric bill says that I used an average of 1000 kWh of electricity each month. Our clothes dryer is responsible for about 1/3 of this energy consumption. I am thinking of getting a new more efficient dryer. My current dryer uses 5.5 kW for each load done on "high temp", takes 1 hour to complete, and we do at least 2 of those per day.
How much energy does my dryer use per year (in kWh)?

The best new model uses a mere 4.0 kW per load? How much more efficient (as %) is that model?

I am paying \$.06 per kWh for electricity. How much am I paying for my current dryer to operate for a year, and how much would I pay if I buy the new, more efficient model?
 - With the recent drop in natural gas prices, it is estimated that I can save 33% on my energy costs for drying if I buy a gas-powered dryer for \$500. I also get a \$50 rebate from the gas company for buying an energy efficient gas appliance. How long will it take me to recover the cost of the new dryer through my rebate and savings? Note: the savings on this dryer are only those realized by the switch from electricity to natural gas to produce the heat.