Energy and changes:

- Energy: Ability to produce heat or do work. Potential (stored) vs. Kinetic (motion)
- Measurement Units: *metric*: 1 calorie = *SI*: 4.184 Joule
  Practice: Convert 350. Calories to Joules
- Energy as an **extensive** property.
  Heat transfers due to difference in temperature. High to low. (High K.E. to low K.E.)
  Compare the heating of 100g of water to 1000g of water. Compare heat and temperature
  (If each sample above absorbed 1000 J, which has more heat? (both same), which has the greater kinetic energy, (100 g), Which has the higher final temperature? (100 g).
  Differentiate heat from temperature (units and definition)
  Temperature: Measure of the average kinetic energy of particles.
  At the same temperature all substances have the same average kinetic energy.
  Kelvin / Celsius scale: same size of temperature change but the zero reference is set differently Kelvin, absolute zero, all particle motion (kinetic energy) stops.
  Celsius 0°C is at 273K where the freezing point of pure water is set. (K=°C + 273)
  Compare adding 100 J to 100g of water and to 100g of Al. Compare heat, temperature and heat capacity.
  Compare heating 100g of Al from RT to 100°C with that of 100g of Al from RT to 50°C
  What factors determine the amount of heat (Q) that is either gained or lost by a substance?
  Amount of material — Mass in grams (g)
  Type of material — Specific Heat (C_p), Amount of heat required to raise 1g by 1°C
  Cp $H_2O_{(l)}$ = 4.184 J/g·°C (See p.72, Table 3.2)
  Compare ΔT with substances Cp (same mass)
  Change in temperature — Change in °C or Kelvin (ΔT)
  Show Power Point presentation for heat concepts. Comparing Heat, Temperature, and Specific Heats

  Derive equation:

$$Q = C_p \times m \times \Delta T$$

Units: $J = J/g{\cdot}°C \times g \times °C$

Sample problems: Emphasis on units and sorting data.
Determine amount of heat, change/final temperature, specific heat, or mass in word problem.

* Model Calorimetry as a laboratory problem that determines the specific heat of a metal.
* Distribute lab sheets for next day lab
In class Practice Worksheet:

Laboratory: Determination of Specific Heat of a Metal, Calorimetry

Pre-Lab: Explain the premise of heat transfer in calorimetry. Discuss the data that must be collected and illustrate the set-up at bench with necessary precautions and technique. Use data to analyze and calculate the results of pre-lab experiment. Have all students calculate and practice. Advise to complete Heat worksheet from previous day.
Supervise and Monitor Lab groups.

Laboratory: Determine the Heat Content of Foods

Pre-Lab: students will be using CBL's with temperature probes to gather time / temperature data.
Use lab bench to show apparatus set-up.
Collect previous day lab.
Students must write up a complete lab report for this experiment.
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