Physics 1101-1120 Prelab Surrey Campus
Last update: August 2008

Expt. 9: Canimals

Read Experiment #9. Note that you will not use uncertainty propagation in this lab, but you should prepare a spreadsheet to perform the following calculations on your experimental data.

A can has a mass of 65.0 g. It has a diameter of 6.0 cm and a height of 11.0 cm. It is filled with 549.0 g of warm water. A plot of how the can's temperature changes with time yields the equation:

$$T = (-0.0035\ °C/s)\ t + 39.0\ °C$$

What is the *d/h* ratio for this canimal?
(Answer: 0.545)

What is the rate of cooling of the can?
(Answer: 8.15)

How much energy, kiloJoules (kJ), would such a canimal expend in a day staying warm?
(Answer: 703.8)

Given that Planters™ dry-roasted peanuts have 790 kJ per 30 g serving, how many grams of peanuts would this canimal need to consume in a day?
(Answer: 26.7)

What is the ratio of the exposed surface area of the canimal to its total mass in cm^2/g?
Note: i. A 'canimal' is defined to be the can plus the water that is in it.
ii. When you calculate the surface area of the can, omit the two circular ends of the can, since they are covered by insulation during the experiment and have negligible heat loss.
(Answer: 0.338)

Note: You will not be allowed into the lab until you show that you have done the prelab and have properly prepared the introductory portion (Title, Objective, Theory Summary and Uncertainty Derivations) of the lab in your notebook.

No extra lab time will be allowed for the time you miss if you are unprepared.