Leslie cube experiment

Physics

Subject: Physics

Sensor: Infrared and Temperature sensors

Overview:

This experiment uses the IR sensor for comparing the energy radiated from a dull black and shiny silver surface.

Equipment required:

LogIT Infrared sensor.
LogIT datalogger.
Sensor extension lead
Leslie cube, Silver & black kettle or similar.

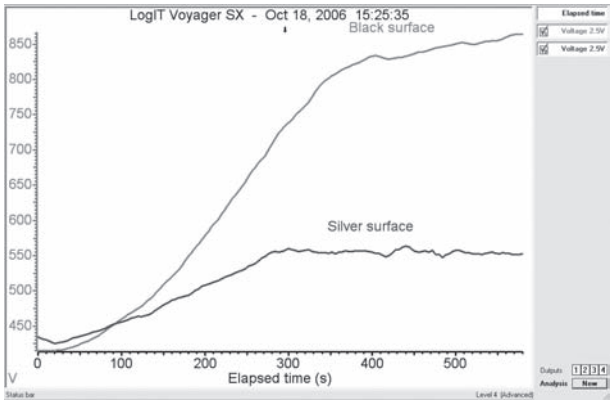
Hazards:

If using warm water, make sure the temperature of the water is suitable for the ability of the students. Water over 55^{O}C can scold.
Care must be taken if using kettles to heat the water.
Place the apparatus in a tray to catch any spilt hot water.
Always check your local regulations or the school advisory service such as CLEAPSS or SSERC for guidance on the use of any hazardous material.

Suggested Method:

1. Clamp the IR sensor gently into a clamp stand.
2. Setup the logging software to use 'Autolog'.
3. Place the sensor about 2 cm from the Silver part of the cube/kettle.
4. Start logging.
5. Stop logging when the plot no longer rises.
6. Repeat the experiment using 'overlay' and point the sensor at the black part of the cube/kettle.

Results:



Graph showing the energy released from the black and silver parts of a kettle.

The kettle was allowed to boil and the marker shown in the center of the graph is the point at which the kettle stopped boiling.

Going further:

By using a temperature sensor to monitor the temperature of the surface being monitored and then plotting Energy W/m^2 against temperature in ^{O}C, a curve should result.