

Infrared Thermometer Heat Conduction Experiment

Goals

- Gain experience using IRT
- Examine heat conduction in different materials

Materials

LabQuest
Infrared Thermometer
Data Collection Cable
Tennis Ball



Procedure

1. **In General:** You will heat up an object or surface by rubbing it with a tennis ball then watch the surface cool off as the heat conducts away from the rubbed area. Compare the cooling rate for different surfaces.
2. Plug the Infrared Thermometer (IRT) into the LabQuest using the Data Collection Cable that has a phone plug on one end and the BTA plug on the other.
3. Start the LabQuest. Set up data collection for 2 samples per second for 60 seconds.
4. Find a suitable surface and rub it vigorously with the tennis ball, heating it. Direct the IRT at the heated area and begin data collection. Direct the IRT at the same position until data collection times out.
5. Tap the file cabinet icon to **Store** this run and get ready for a second run.
6. Repeat the procedure for other surfaces, storing each but noting which surface was used for which run.

Analysis

1. Display one run. Select a section of the graph where the temperature was dropping steadily. Select **Graph > Analyze > Curve Fit > Temperature**. Choose **Linear** from the drop-down menu. Note the equation that appears. The slope (m) is the cooling rate and should be in $^{\circ}\text{C/s}$.
2. Repeat the analysis for each of your samples, recording the rate for each.
3. Explain why the surfaces with the highest rate had faster cooling than surfaces with the lower rate.

Data

Surface	Cooling Rate $^{\circ}\text{C/s}$