

Name _____
Class _____ Date _____

WORK AND HEAT LAB

Aim: to estimate the work done on some lead shot using the change of temperature produced.

In modern terms, if all the potential energy available to an object is converted to kinetic energy when the object falls, and this kinetic energy is all converted to heat when the object stops falling, then we can say:

$$Q = PE$$
$$mc\Delta T = mgh$$
$$\Delta T = gh/c$$

We will use lead shot and a glass tube, rather than water and a waterfall. The specific heat capacity of lead is 130 J/kgC° . We want the lead shot to fall about 50 metres in the tube, to get a significant difference in temperature. The ends of the tube will be stopped with rubber stoppers. A thermometer will be used to determine the change in temperature. We will wrap a section of the thermometer in masking tape, to act as a plug to stop the shot escaping while we measure the temperature.

Your report should consist of the results, discussion and conclusion. While performing this experiment, some issues will have been raised and solved. Make sure you refer to these in your discussion. The issues *include* – does it matter how much mass we use? How accurate do we need to be or how accurate can we be? Do we expect 100% efficiency? What change in temperature do we expect? Why is lead shot more suitable than water? (No, its not because water would leak out of the tube.)

Remember the criteria given by the IB for assessing evaluation. Think. In order to get a 3 you must look beyond the hints and information I've given you.