

Answers



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specific heat capacity candle power

1. Plot a graph of temperature vs time for this experiment.
2. Why did I drill a hole in the lid to hold the thermometer instead of just standing the thermometer in the water?
To reduce heat loss to the air
3. There are many sources of error in this experiment. Describe 3 of them and say whether they will cause me to over or under-estimate the power output of the candle.

The candle loses a lot of heat to the air and the glass jar causing us to underestimate the candle's power.

The water will lose heat through the walls of the jam jar by conduction, also causing us to underestimate the candle's power.

The candle may not burn at a uniform rate, introducing a random error into the power output.

The jam jar lid will conduct heat to the air causing an underestimate of the candle's power.

Fail! Specific heat capacity of 2 materials

1. Plot a graph of temperature vs time for this experiment.
2. Take the specific heat capacity of steel to be 420J/Kg K. How much energy should it take to heat the steel nuts in this video by 30K? $E = m c \Delta T = 0.08513 * 420 * 30 = 1072J$
3. Do the same calculation for the water in this video. $E = m c \Delta T = 0.0731 * 4182 * 30 = 9171J$
4. Why do you think my result was so far off? **Since the experiment is set up the same as the other video the sources of systematic error mentioned on the left should all be in-play in this experiment too but this means the value of 11W remains a good estimate of how rapidly the jam jar and its contents absorb heat energy in these circumstances, therefore they cannot be reasons for the current error. Compare the flame at 0:34 and then 1:36 (video time) and I think the most likely reason is actually the non-uniform burn rate of the candle, if it burned slower because it was running out of wax we would have over estimated the heat capacity of steel which is what happened.**