Electric Kettle Efficiency

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Your Lab Write up Needs to have

Objective: What you are going to do in your lab. The Goal or purpose of it.

Diagram: Must show all equipment being used and the setup of that equipment. (Drawn with pencil and ruler)

Theory: Describe the physics being used and explain why what you are doing should work. (Should include formulas being used)

Procedures: Step by step guide to doing the lab

Data section: Neatly provide all the data collected (use tables when appropriate)

Calculations: provide a sample calculation of each type used

Discussion and Errors: Discuss observations and possible errors in your lab

Conclusion: State what your lab found (very similar to the objective)

Phase 1: Experimentally Calculate the specific heat capacity of a clear liquid

Theory:

Two liquids, one unknown, one known.

Known liquid we will know $m, C, \Delta T$

Liquid 1   Liquid 2   unknown liquid we will measure $m, \Delta T$

different Temperatures

mix together: Liquid 1 will deposit energy into Liquid 2.

i.e. $\underline{\underline{Q_1 = -Q_2}}$

Procedures:

Now we will know $Q_2, m_2, \Delta T_2$

So we can Calculate C_2

Phase 2: Calculate the efficiency of an electric Kettle

Theory: $\varepsilon = \dfrac{P_{out}}{P_{in}}$ We know the input power

find the output power

Theory:

$$\varepsilon = \frac{P_{out}}{P_{in}}$$

We know the input power

How will we find the output power

Boil the
Liquid and
use all measurements
to find

$$\frac{P_{out}}{P_{in}} = \varepsilon$$

$$P = \frac{W}{t}$$

- measure the time

$$W = \Delta \varepsilon = \Delta Q$$

$$Q = m C (T_f - T_i)$$

- measure m, T_f, T_i
- use C from Phase 1

Procedure:

Calculate Q and use it to Find

$$P_{out} = \frac{Q}{t}$$