

SPECIFIC HEAT OF AN UNKNOWN METAL – Honors and AP Chemistry

Review the lab procedure as discussed in class and exemplified in the Specific Heat Dry Lab handout. Start a section in your comp book under Specific Heat Lab Activity. Write a Purpose, Equipment List, Reagent list, and Procedure based on the discussion and the Dry Lab diagram provided in class and answer all Pre-Lab Questions in your Lab Book. Set up a Data Table to enter all required data that you need to collect for this lab. Be sure to include unit labels in the table for all data needed *prior to arrival in the lab*.

Answer these Pre-Lab Questions:

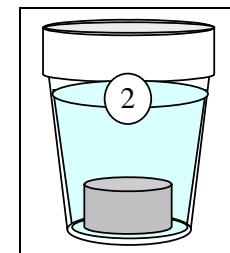
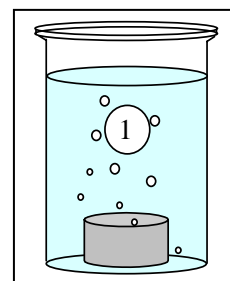
1. Specific heat is considered a physical property because . . . ?
2. Is water a conductor or an insulator of heat?
3. When you put a hot piece of metal into room temperature water, draw a simple diagram with directional arrows accompanied by an explanation in describing the direction of heat flow.
4. Sketch a graph of the temperature of the metal and the water versus time as you would *expect to see* as a result of this experiment. Start the graph when the metal is dropped in and end when they have reached equilibrium. Use two colors to show the temperature of the water versus the temperature of the metal.
5. What would be the final temperature if 5754 joules of heat energy were applied to a 25 gram sample of water which began at a room temperature of 30°C.? (Show your labeled set up & calculation)

Completing the Lab:

1. Review your Data Table, insuring that all labels have been properly included. Complete your Calculations showing one complete fully labeled sample of each type of calculation needed to complete this lab.
2. Write the Conclusion of this lab stating the experimentally determined specific heat of the unknown metal and its probable identity.
3. Complete your write-up on the Specific Heat Lab Activity by answering the following questions in your comp book and completing your Journal Entry:

Post-Lab Questions:

- 1) Draw a diagram of the beaker with boiling water and the metal inside. Label this Diagram #1. Show the direction of heat flow between the water and the metal with arrows.
- 2) In respect to the metal in Diagram #1, is this an exothermic or endothermic representation?
- 3) What is the appropriate SIGN (+/-) of the energy flow in Diagram #1?
- 4) Draw a cross-section diagram of the calorimeter (cup) with the metal in water inside. Label this as Diagram #2. Show the direction of heat flow using arrows representing what happened *after* you added the metal to the calorimeter.
- 5) From the perspective of the metal, is this an endothermic or exothermic representation of energy flow?
- 6) What is the appropriate SIGN (+/-) of the energy flow in Diagram #2?
- 7) Sketch the shape of the graph that you got as a result of your experiment. Did this support your previous hypothesis? (If not, explain why.)
- 8) Which changed temperature more, the water or the metal? *Why?*
- 9) Describe the errors that influenced your data and how they affected the calculated outcome.
- 10) How could one change or improve this experiment to reduce the *amount of error*?



Journal Entry:

Describe in full and complete sentences any difficulties or problems you had while working to complete this activity. What were you able to recall *without* assistance? What did you need to research or review? Try to be as explicit as possible in your reflection as to what you did or did not know, did not remember or were not able to do without assistance. Complete this entry with a summary of all the chemistry skills and concepts that were needed to complete this laboratory task.