

Introduction

In this lab we will use laboratory hot plate and thermometer to record temperature data for the heating of a water based sample. By recording the temperature over a set amount of time, one recording every 30 seconds, we can build a graph of the heat curve of water. By calculating the slope of the graph we can find the temperature change per second based on the heat capacity.

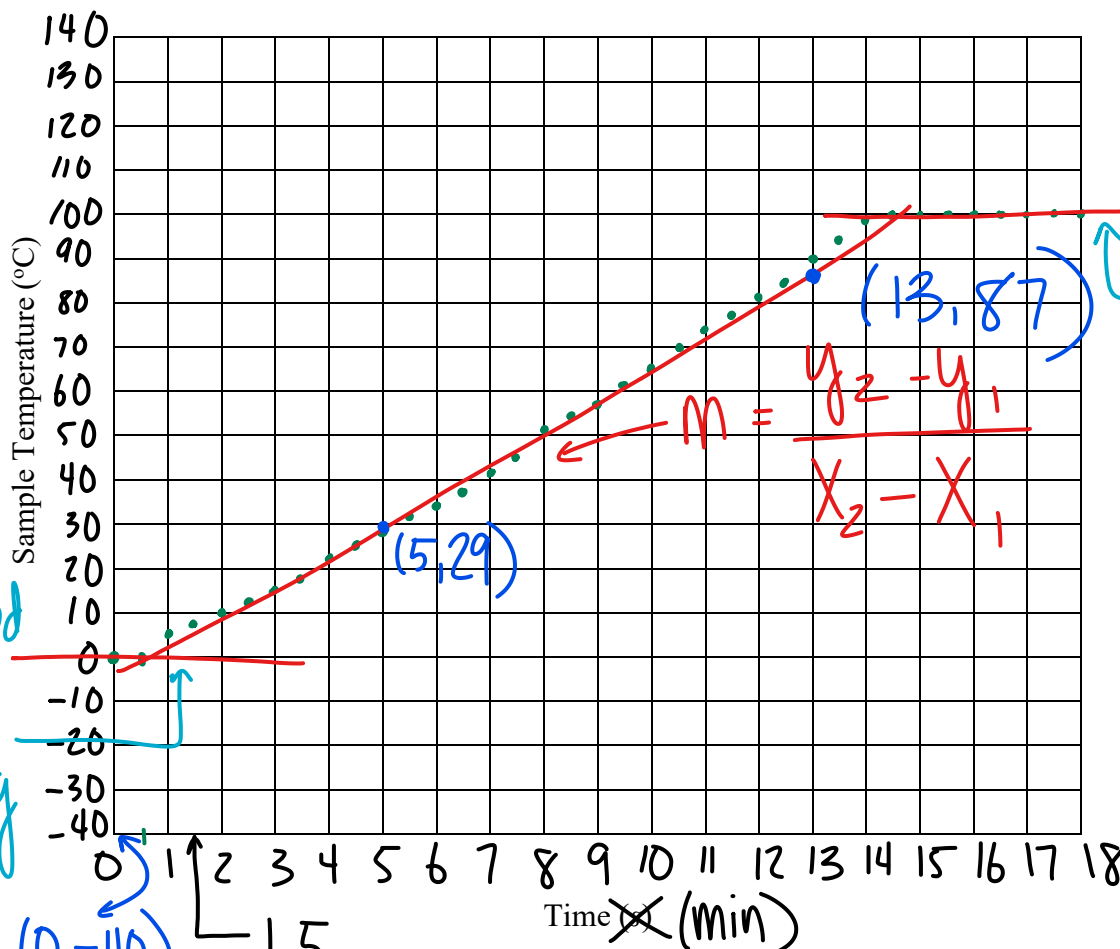
Procedure

1. Prepare lab station based on the example given in class. The thermometer should be held in a thermometer clamp and move into the liquid sample before heating begins.
2. Obtain a 250mL beaker add 2 – 3 ice cube, then fill it to the 250mL mark. Ice cubes will likely float to the top of the beaker.
3. Record the initial temperature reading and record on data table.
4. Turn on heat and allow hot plate to heat water sample. Record temperature of the sample every 30 seconds until the sample boils for 3 minutes total.

Data Table For Time and Temperature for heat curve graph

Time X	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5
Temp Sample y	0	0	5	7	10	12	15	18	22	25	29	31	34	38	41	46
Time X	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5
Temp Sample y	51	54	57	61	65	70	74	78	81	86	90	94	98	100	100	100

Graph of Heat Curve for a liquid sample



Calculations

Slope of Graph (*Temperature vs Time*)

Graph Data Points

Data Point	Time (x-axis)	Temperature (y-axis)
1	5	29
2	13	87

Slope of Graph ($m = [y_2 - y_1]/[x_2 - x_1]$)

m =	$87 - 29$
m =	$13 - 5$
m =	$7.25^{\circ}\text{C}/\text{min}$

ΔT is 7.25°C in 1 min

Lab Questions

Based on the graph, what is the melting point and boiling point of water?		Was the slope of the graph positive or negative? What does the slope of the graph determine?
Melting Point (MP)	(starting temp) 0°C	Slope is + ΔT inc. w/time
Boiling Point (BP)	(final temp) 100°C	
In the heat curve, why does the temperature not change at the beginning of the curve?		In the heat curve, why does the temperature not change at the end of the curve?