Graphical Analysis
Physics Honors 2013/14

Graphing Practice

Name KEY

Experiment 1:

In fighting industrial fires, firefighters must be especially cautious since many of the chemicals found in large factories are extremely flammable. During the flame lab we will learn that before a liquid can create a flame it must first evaporate into a vapor. In an effort to better understand and mitigate the dangers that firefighters face in an industrial setting, Dr Michael Ravagan of the Occupational Safety and Health Administration (OSHA) conducted a test to see how increasing temperatures during a fire affect how much of a chemical will evaporate in a given time. They began the experiment with a cold liquid and allowed it to evaporate for an hour. After an hour Dr Ravagan measured the remaining volume and recorded how much liquid evaporated. The experiment was repeated at many different temperatures. These temperatures were 75.1 °C, 112.3 °C, 135.6 °C, 172.8 °C, 226.1 °C, 301.0 °C, 368.7 °C, and 453.2 °C. The amount of liquid that evaporated at each temperature was 0.473 mL, 0.838 mL, 0.888 mL, 1.193 mL, 1.583 mL, 2.206 mL, 2.422 mL and 3.163 mL.

Trial #	Temp (°C)	Fluid Evap (mL)
1	75.1	0.473
2	112.3	0.838
3	135.6	0.888
4	172.8	1.193
5	226.1	1.583
6	301.0	2.206
7	368.7	2.422
8	453.2	3.163

1. Which variable is the independent variable? Why did you choose this variable?

Temp. Because The Experimenter Varied It

2. Which variable is the dependent variable? Why did you choose this variable?

Volume of fluid Evaporated because the Experimentor measured The Effect of temp on Evaporation

Fill out the data table above.

3. Show your calculation for determining the scale for the x and y-axes below. Be sure to use units on all numbers. Show the scale before and after rounding.

x-axis

$\frac{453}{27} = 16$

USE 20

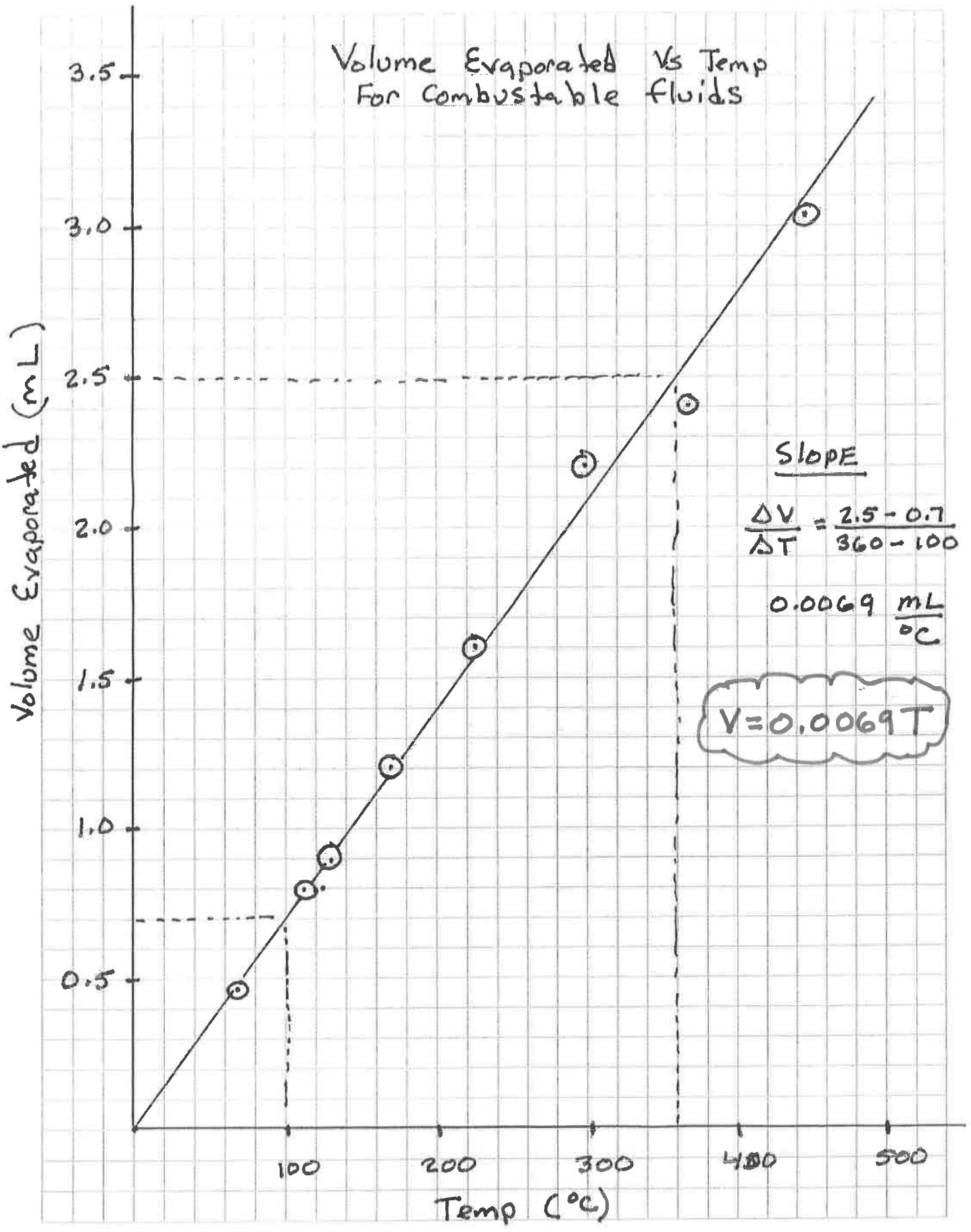
100 per 5

y-axis

$\frac{3.16}{37} = 0.085$ USE 0.1

1# 0.5 / 5 BOXES

Graph the data properly and draw a best fit line through the data.



Experiment 2:

Plastic bags are made from polymers, which are very long molecules that have relatively large mass. The strength of the plastic bag is related to the average mass of the individual molecules that make up the bag; the greater the average mass of the molecules, the stronger the bag. However, more massive molecules are more expensive to make. Plastic bag factories must then try to produce plastic bags that are just strong enough to do the job. Dr. Jan Schwan, a materials scientist at Hefty, had her team of chemists produce bags with different average molecular masses; each bag was then tested for the number of grams of sand that it could hold before the bag tore. The average molecular masses that the scientists used were 35.1, 117.6, 153.2, 183.4, 222.0, and 250.5 amu[1]. Each of the bags could hold 3.5, 17.8, 19.7, 27.4, 31.4, & 36.2 kg respectively.

Trial #	Bag Mass	Bag STRENGTH
1	35.1	3.5
2	117.6	17.8
3	153.2	19.7
4	183.4	27.4
5	222.0	31.4
6	250.5	36.2

1. Which variable is the independent variable? Why did you choose this variable?

THE Atomic Mass of the Bag is the independent Variable Because it is Varied By the Scientist

2. Which variable is the dependent variable? Why did you choose this variable?

Bag Capacity Because it depends on the atomic Mass of the Bag Material

3. Fill out the data table above.

4. Show your calculation of the scale for the x and y-axes below. Be sure to use units on all numbers. Show the scale before and after rounding.

x-axis

$\frac{250.5}{28} = 8.9$

USE 10

y-axis

$\frac{36.2}{38} = 0.95$ USE 1

5. Graph the data properly and draw a best fit line through the data.

[1] Since atoms are very small, measuring their mass in grams is inconvenient. An atomic mass unit (amu) was defined to as 1/12 the mass of the Carbon 12 isotope, approximately $1.66053886 \times 10^{-27}$ kg.