Name	Henry Jeckyll	Date	10/31/2007
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Experiment 1: Are the Densities of Coke and Diet Coke Different?

Objectives:

To learn how to use pipettes, burettes, and graduated cylinders

To learn how to use an analytical balance

To measure and compare the densities of Coke and Diet Coke and verify that density is an intensive property.

Part 1 — Are the Densities of Coke and Diet Coke Different?

Sample used: Coke

Sample Temperature: 21.7 °C

Burette volumes	Trial 1	Trial 2
Initial Burette Reading (ml)	12.23	17.25
Final Burette Reading (ml)	17.25	22.25
Volume Delivered (ml)	5.02	5.00

	Pipette		Grad. Cylinder		Burette	
	Trial 1	Trial 2	Trial 1	Trial 2	Trial 1	Trial 2
Mass of Empty Beaker (g)	25.6905	26.8801	30.2965	28.3715	27.7561	28.4398
Mass of Beaker + Liquid Sample (g)	30.8925	32.0561	35.4533	33.5427	32.8800	33.4878
Mass of Liquid Sample (g)	5.2020	5.1760	5.1568	5.1712	5.1239	5.0480
Volume Delivered (ml)	5.00	5.00	5.01	4.98	5.02	5.00
Calculated Density (g/ml)	1.0404	1.0352	1.0293	1.0384	1.0207	1.0096

[Note: All data in this sample report is made up. It will give you an idea of what to expect, but your actual data will not necessarily look like this. However, ALL masses should be reported to four decimal places, and all volumes should be reported to two decimal places. Pipette volumes are exactly 5.00 ml, and all other volumes are what you measure them to be.]

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Results from combined class data

Sample	Average Density ± Std. Dev (g/ml)		
	Pipette	Grad. Cyl.	Burette
Coke	1.033 ± 0.008	1.03 ± 0.04	1.042 ± 0.005
Diet Coke	0.997 ± 0.004	1.0±0.2	0.99 ± 0.02

Part 2 Does the size of the sample affect the density?

Sample used: Coke

Volume assigned 18 ml

	Trial 1	Trial 2
Mass of Empty Beaker (g)	25.6894	26.8785
Mass of Beaker + Liquid Sample (g)	44.3401	45.3902
Mass of Liquid Sample (g)	18.6507	18.5117
Initial Burette Reading (ml)	9.52	27.54
Final Burette Reading (g)	27.54	45.53
Volume Delivered (ml)	18.02	17.99

[Be sure to report the actual volume dispensed, not simply the amount you were assigned to use, and again, report masses to four decimal places and volumes to two.]

Sample	Density (g/ml) determined from the plot
Coke	1.032
Diet Coke	0.997

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Sample density calculation:

Pipette, Trial 1: Mass of liquid = 30.8925 - 25.6905 = 5.2020
Density = mass / volume
Density = 5.2020 / 5.00
Density = 1.0404 g/ml

DISCUSSION QUESTIONS

The average densities and their standard deviations from the class data for part 1 are:

COKE:	Pipette	1.033 ± 0.008 g/ml
	Graduated Cylinder	1.03 ± 0.04 g/ml
	Burette	1.042 ± 0.005 g/ml
DIET COKE:	Pipette	0.997 ± 0.004 g/ml
	Graduated Cylinder	1.0±0.2 g/ml
	Burette	0.99 ± 0.02 g/ml

I would expect the Coke to have a higher density than the Diet Coke because it has more sugar in it.

The results of Part 1 for the pipette and for the graduated cylinder do indicate that the densities of Coke and Diet Coke are different. The density values for the Coke samples are consistently higher than those for Diet Coke, and the difference is greater than the margin of error (the standard deviation). For the graduated cylinder, however, the error is much greater, and although the density of Coke is higher than that of Diet Coke, the values overlap when the error is taken into account, so there is no statistical difference between the densities. So there does appear to be a difference in the densities of Coke and Diet Coke, but the graduated cylinder is not sufficiently precise to be able to detect that difference.

[Continue on with the rest of the discussion questions. Don't just throw down the first thing that comes to mind -- think about the questions and write thorough answers using complete sentences. Be sure to include copies of all three graphs with your report, and remember to also attach copies of all three graphs to your lab notebook.]