

EXPERIMENT #2 MASS AND VOLUME RELATIONSHIPS

SEPTEMBER 9, 2014

MASS AND VOLUME OF SODA

Sink or Float?

Sink or Float?

ENROLLED STUDENTS

SEPTEMBER 9, 2014

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DETERMINE THE DENSITY OF COKE & DIET COKE

REGULAR COKE

- DETERMINE THE MASS OF THE COKE
 - MASS OF EACH CAN OF COKE
 - FIND AVERAGE MASS
 - SUBTRACT THE MASS OF AN EMPTY CAN
- DETERMINE IF A CAN OF COKE WILL SINK OR FLOAT
 - PUT THE COKE IN A BUCKET OF WATER AND OBSERVE
- DETERMINE THE VOLUME OF THE COKE
 - READ THE CAN LABEL FOR THE VOLUME CONTENTS
- DETERMINE THE DENSITY OF THE COKE
 - USE $D=M/V$ TO DETERMINE THE DENSITY

DIET COKE

- DETERMINE THE MASS OF THE COKE
 - MASS OF EACH CAN OF COKE
 - FIND AVERAGE MASS
 - SUBTRACT THE MASS OF AN EMPTY CAN
- DETERMINE IF A CAN OF COKE WILL SINK OR FLOAT
 - PUT THE COKE IN A BUCKET OF WATER AND OBSERVE
- DETERMINE THE VOLUME OF THE COKE
 - READ THE CAN LABEL FOR THE VOLUME CONTENTS
- DETERMINE THE DENSITY OF THE COKE
 - USE $D=M/V$ TO DETERMINE THE DENSITY

WHEN USING A BALANCE

- KEEP THE BALANCE PANS CLEAN AND DRY.**
CLEAN UP IMMEDIATELY ANY CHEMICAL THAT IS SPILLED.
- MAKE CERTAIN THE BALANCE IS LEVEL.**
SENSITIVE BALANCES USUALLY HAVE A BUBBLE LEVEL. THE BALANCE IS LEVEL WHEN THE BUBBLE IS CENTERED IN THE BLACK CIRCLE ON THE BUBBLE LEVEL ERROR WILL BE INTRODUCED INTO THE READING IF THE BALANCE IS NOT LEVEL.
- CHECK THE REST POINT (OR TARE) OF THE EMPTY BALANCE.**
ELECTRONIC BALANCES HAVE NO SWINGING BEAM BUT USUALLY HAVE A TARE BUTTON THAT ALLOWS YOU TO ZERO THE READING. IF YOU HAVE A PLATFORM OR TRIPLE-BEAM BALANCE, FIRST BE SURE ALL MOVABLE BEAM WEIGHTS ARE AT THEIR ZERO POSITION. THEN RELEASE THE BEAM RELEASE IF THE BALANCE HAS ONE, GIVE THE PAN A LITTLE PUSH TO CAUSE IT TO SWING. GENTLY, AND NOTE THE CENTRAL POSITION ON THE SCALE ABOUT WHICH THE POINTER OSCILLATES. USE THIS POINT AS THE REFERENCE-ZERO REST POINT IN YOUR WEIGHINGS. NEVER TAKE READINGS WITH THE BEAM AND POINTER AT REST. WHEN THE BALANCE BEAM IS STATIONARY, IT IS POSSIBLE FOR THE BALANCE BEAM SUSPENSION TO STICK IN A POSITION THAT IS NOT THE TRUE EQUILIBRIUM POSITION. IF THE POINTER READING DIFFERS BY MORE THAN TWO TO THREE SCALE DIVISIONS FROM THE MARKED ZERO POINT, HAVE YOUR INSTRUCTOR ADJUST THE BALANCE. DO NOT CHANGE THE BALANCE ADJUSTMENTS YOURSELF.
- NEVER WEIGH AN OBJECT WHILE IT IS WARM. THE CONVECTION**
CURRENTS OF WARM AIR WILL AFFECT THE MASS READING OF AN ELECTRONIC BALANCE OR THE REST POINT OF A BALANCE BEAM.
- AFTER WEIGHING AN OBJECT, RETURN THE BEAM WEIGHTS**
TO THE ZERO POSITION, AND RESTORE THE BEAM RELEASE TO ITS REST POSITION.

Temp (°C)	Density (g/mL)	Temp (°C)	Density (g/mL)	Temp (°C)	Density (g/mL)	Temp (°C)	Density (g/mL)
0.0	0.99984	1.0	0.99983	13.0	0.99726	26.0	0.99479
0.2	0.99984	1.8	0.99981	13.2	0.99724	26.2	0.99476
0.4	0.99984	2.6	0.99979	13.4	0.99722	26.4	0.99473
0.6	0.99983	3.4	0.99977	13.6	0.99720	26.6	0.99470
0.8	0.99982	4.2	0.99974	13.8	0.99718	26.8	0.99467
1.0	0.99981	5.0	0.99971	14.0	0.99716	27.0	0.99464
1.2	0.99980	5.8	0.99968	14.2	0.99714	27.2	0.99461
1.4	0.99979	6.6	0.99965	14.4	0.99712	27.4	0.99458
1.6	0.99978	7.4	0.99962	14.6	0.99710	27.6	0.99455
1.8	0.99977	8.2	0.99959	14.8	0.99708	27.8	0.99452
2.0	0.99976	9.0	0.99956	15.0	0.99706	28.0	0.99449
2.2	0.99975	9.8	0.99953	15.2	0.99704	28.2	0.99446
2.4	0.99974	10.6	0.99950	15.4	0.99702	28.4	0.99443
2.6	0.99973	11.4	0.99947	15.6	0.99700	28.6	0.99440
2.8	0.99972	12.2	0.99944	15.8	0.99698	28.8	0.99437
3.0	0.99971	13.0	0.99941	16.0	0.99696	29.0	0.99434
3.2	0.99970	13.8	0.99938	16.2	0.99694	29.2	0.99431
3.4	0.99969	14.6	0.99935	16.4	0.99692	29.4	0.99428
3.6	0.99968	15.4	0.99932	16.6	0.99690	29.6	0.99425
3.8	0.99967	16.2	0.99929	16.8	0.99688	29.8	0.99422
4.0	0.99966	17.0	0.99926	17.0	0.99686	30.0	0.99419
4.2	0.99965	17.8	0.99923	17.2	0.99684	30.2	0.99416
4.4	0.99964	18.6	0.99920	17.4	0.99682	30.4	0.99413
4.6	0.99963	19.4	0.99917	17.6	0.99680	30.6	0.99410
4.8	0.99962	20.2	0.99914	17.8	0.99678	30.8	0.99407
5.0	0.99961	21.0	0.99911	18.0	0.99676	31.0	0.99404
5.2	0.99960	21.8	0.99908	18.2	0.99674	31.2	0.99401
5.4	0.99959	22.6	0.99905	18.4	0.99672	31.4	0.99398
5.6	0.99958	23.4	0.99902	18.6	0.99670	31.6	0.99395
5.8	0.99957	24.2	0.99899	18.8	0.99668	31.8	0.99392
6.0	0.99956	25.0	0.99896	19.0	0.99666	32.0	0.99389
6.2	0.99955	25.8	0.99893	19.2	0.99664	32.2	0.99386
6.4	0.99954	26.6	0.99890	19.4	0.99662	32.4	0.99383
6.6	0.99953	27.4	0.99887	19.6	0.99660	32.6	0.99380
6.8	0.99952	28.2	0.99884	19.8	0.99658	32.8	0.99377
7.0	0.99951	29.0	0.99881	20.0	0.99656	33.0	0.99374
7.2	0.99950	29.8	0.99878	20.2	0.99654	33.2	0.99371
7.4	0.99949	30.6	0.99875	20.4	0.99652	33.4	0.99368
7.6	0.99948	31.4	0.99872	20.6	0.99650	33.6	0.99365
7.8	0.99947	32.2	0.99869	20.8	0.99648	33.8	0.99362
8.0	0.99946	33.0	0.99866	21.0	0.99646	34.0	0.99359
8.2	0.99945	33.8	0.99863	21.2	0.99644	34.2	0.99356
8.4	0.99944	34.6	0.99860	21.4	0.99642	34.4	0.99353
8.6	0.99943	35.4	0.99857	21.6	0.99640	34.6	0.99350
8.8	0.99942	36.2	0.99854	21.8	0.99638	34.8	0.99347
9.0	0.99941	37.0	0.99851	22.0	0.99636	35.0	0.99344

$\text{mass \% sugar} = \frac{\text{g sugar}}{\text{g cola}} \times 100\%$
 $\text{density} = \frac{\text{mass}}{\text{volume}}$



Mass and Volume Relationships

1. The Density of Sugar

2. The Density of Sugar

3. The Density of Sugar

4. The Density of Sugar

EXPERIMENT 2

Mass and Volume Relationships

Purpose

Relevant Equations

Procedure

1. Density of Sugar

2. Density of Sugar

3. Density of Sugar

4. Density of Sugar

Mass and Volume Relationships

1. The Density of Sugar

2. The Density of Sugar

3. The Density of Sugar

4. The Density of Sugar

Mass and Volume Relationships

1. The Density of Sugar

2. The Density of Sugar

3. The Density of Sugar

4. The Density of Sugar

EXPERIMENT 2

Mass and Volume Relationships

Name: _____

Date: _____

Section: _____

1. The Density of Sugar

2. The Density of Sugar

3. The Density of Sugar

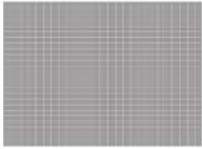
4. The Density of Sugar

REPORT 2 SHEET 2

Name: _____

4. Making a graph of the data

Make a graph of distance (in meters) versus time (in seconds) on a grid with a horizontal axis labeled "Time (s)" and a vertical axis labeled "Distance (m)". The grid should be 10 cm wide and 10 cm high. The origin (0,0) should be at the bottom-left corner. The horizontal axis should be labeled "Time (s)" and the vertical axis should be labeled "Distance (m)". The grid lines should be spaced 1 cm apart. The horizontal axis should range from 0 to 10 seconds, and the vertical axis should range from 0 to 10 meters. The grid should be 10 cm wide and 10 cm high. The origin (0,0) should be at the bottom-left corner. The horizontal axis should be labeled "Time (s)" and the vertical axis should be labeled "Distance (m)". The grid lines should be spaced 1 cm apart. The horizontal axis should range from 0 to 10 seconds, and the vertical axis should range from 0 to 10 meters.



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5. The Beauty of Jahnke

Use the data in the table below to complete the graph on the grid on the previous page.

	David 1	David 2
Time (s)	0.00	0.00
Distance (m)	0.00	0.00
Time (s)	0.05	0.05
Distance (m)	0.05	0.05
Time (s)	0.10	0.10
Distance (m)	0.10	0.10
Time (s)	0.15	0.15
Distance (m)	0.15	0.15
Time (s)	0.20	0.20
Distance (m)	0.20	0.20
Time (s)	0.25	0.25
Distance (m)	0.25	0.25
Time (s)	0.30	0.30
Distance (m)	0.30	0.30
Time (s)	0.35	0.35
Distance (m)	0.35	0.35
Time (s)	0.40	0.40
Distance (m)	0.40	0.40
Time (s)	0.45	0.45
Distance (m)	0.45	0.45
Time (s)	0.50	0.50
Distance (m)	0.50	0.50
Time (s)	0.55	0.55
Distance (m)	0.55	0.55
Time (s)	0.60	0.60
Distance (m)	0.60	0.60
Time (s)	0.65	0.65
Distance (m)	0.65	0.65
Time (s)	0.70	0.70
Distance (m)	0.70	0.70
Time (s)	0.75	0.75
Distance (m)	0.75	0.75
Time (s)	0.80	0.80
Distance (m)	0.80	0.80
Time (s)	0.85	0.85
Distance (m)	0.85	0.85
Time (s)	0.90	0.90
Distance (m)	0.90	0.90
Time (s)	0.95	0.95
Distance (m)	0.95	0.95
Time (s)	1.00	1.00
Distance (m)	1.00	1.00

Use the data in the table above to complete the graph on the grid on the previous page. The horizontal axis should be labeled "Time (s)" and the vertical axis should be labeled "Distance (m)". The grid lines should be spaced 1 cm apart. The horizontal axis should range from 0 to 10 seconds, and the vertical axis should range from 0 to 10 meters.

CONSIDER THIS

Use the data in the table above to complete the graph on the grid on the previous page. The horizontal axis should be labeled "Time (s)" and the vertical axis should be labeled "Distance (m)". The grid lines should be spaced 1 cm apart. The horizontal axis should range from 0 to 10 seconds, and the vertical axis should range from 0 to 10 meters.

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