Exp. No.	Experiment/Subject	Date	
Name	Lab Partner	Locker/ Desk No.	Course & Section No.

Procedure cont -

Calculate the standard deviation.

- Weigh a dry 150mL breaker on an electronic balance. Record the uncertainty, then determine the average mass and standard deviation.
- Weigh 2.500g of graduated sugar on electronic balance. Determine the percent error.
- Into the same graduated cylinder you used in above, add about 10 mL of distilled water at room temperature. Add about 10 mL of distilled water at room temperature.
- Record the volume of water in the graduated cylinder.
- Weigh the graduated cylinder containing the water. determine the mass of water in the graduated cylinder.
- Setup a clean buret and rinse with distilled water. Fill the buret with distilled water and drain enough water through the tip to flush out any air bubbles.

Bring the water level to below the 0.0mL marks.

Drain about 10mL from the buret into 250mL dry breaker

Record the find volume recording from the buret to obtain the measured volume of water deived from the buret.

Signature	Date	Witness/TA	Date

Exp. No. 2	Experiment/Subject Measurment	Date 9/18/2023	
Name Emmeen Kailash Ramesh	Lab Partner	Locker/ Desk No. 1203	Course & Section No. Chem 213 208

Measurements

Reference: "An Experiments in thinking Scientifally", D.J sardella .J chem Ed. 69.933 (1992).

Purpose: To learn how to use common equipments correctly in order that your measurements in the laboratory are as accurate and precise as possible.

Materials: Electronic balance, Graduated Cylinder. Pipet. Buret Calculator, 150mL Breaker. 250ml Distilled water. Thermometer

Prodeure: . place approximately 250mL of distilled water in a large breaker and allow it to come to room temperature.

place a theromometer in the water and record its temperature.

Record temperature of the air in the room.

Weight a dry 25-mL graduated cylinder on an electronic balance Record the uncertainty of the measured mass. Repeat twice, Zeroing the balance before each trail. Determine the averge mass.

Signature	Date	Witness/TA	Date

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Weigh the breaker and water to determine the mass of water delivered from the buret.

Weigh 2.500g of granulated sugar on the eletronic balance.

Determine the percent error.

Using the a 10mL volumetric piplets, deionized water into the clean dried 150mL breaker from the measuring Mass section. Record the mass of the 150 mL Breaker and DI water

ignature	Date	Witness/TA	Date

Exp. No.	Experiment/Subject	Date	
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Raw and Processed data for Glassware Analysis

	25mL Graduated cyld	10ml Vol pipette	50ml Burette
Room Temperature	23	23	23
Density of Water	0.997	0.997	0.997
Vol Pipette Reading mL		10mL	
Burette Initial Reading mL		24.7 mL	
Burette Final Readings		15.3 mL	
Measured Volume of H20 mL	10mL	10mL	9.4mL
Mass H20 + Glassware(g)	21.4341g	81.576	82.069g
Calculated Mass H20g	10.146 grams	10.032grams	10.525
Theoretical Vol H20(mL)	10.176	10.062	10.556
Error of Volume	17.60	0.21	5.62
Relative Uncertainty	1.76	.621	5.62

ND

Signature	Date	Witness/TA ND	Date

Exp. No.	Experiment/Subject	Date	
Name	Lab Partner	Locker/ Desk No.	Course & Section No.

Obsrvations: Same breaker Lane different measurment in the balance Which include How weights can vaoriouss depend on way and tools that you use. the measurment are very relatey close.

Average: $\frac{11.197+11.195+11.194}{3}$, $\frac{71.544+71.543+71.545}{3}$

$= 11.195$ $= 71.543$

SD $\frac{\sqrt{(11.197-11.195)^2+(11.195-11.195)^2+(11.94-11.195)^2}}{3-1}$ $\frac{\sqrt{(71.544-71.543)^2+(71.543-7153)^2+}}{3-1}$

$= 0.0012$ $= 4.71\times10^{-4}$

Mass H_2O $= 21.341-11.195 = 10.146$ grams , $81.576-71.543 = 10$ 32, 82.06 - 71.543 $= 10.5$

density $= \frac{10}{10.146} = 1.0146$, $\frac{10}{10.032} = 1.0032$, $\frac{10}{10.825} = 1.052$

TV $\neq \frac{10.146}{1.0146} = 10$, $\frac{1.0032}{1.0032} = 10$, $\frac{10.556}{1.052} \neq 10$

Error V $= \frac{(10.176-10)*100}{17.60}$, $\frac{10.062-10*100}{6.21}$, $\frac{10.556-10*100}{55.62}$

RV $\frac{17.60}{10} = 1.760$ $\frac{6.21}{10} = .621$ $\frac{55.62}{10}$ 5.562

Signature	Date	Witness/TA ND	Date

Discussion: In this measuring, the granulated sugar error was systemic as one formed because of the types of instruments and ways they were measured. This error can be predictable as it shows different values same weight sugar, and different instructions this allows us to see exact values with the calculation of measurements. The mass of the 15 ml (about 0.51 oz) breaker and 25 ml (about 0.85 oz) graduated cylinder tends to vary every time you measure which means that it forms a random error as it cannot vary the weight every time you measure the same items. In this experiment, 15ml (about 0.51 oz) breaker is more precision than the graduated one as the standard deviation of the breaker is more around the mean but the 25 ml (about 0.85 oz) graduated cylinder is more spread which results in more spread out data which means that data is not very precision as it does not data relate to each other. Each glassware has several types of measuring which result in several types of values for the same number of substances and each one has different accuracy. A graduated cylinder is most accent in this experiment because it is Advantage of having lower percent error than the rest of the glassware, but it does it disadvantages as it can have higher rates of error for specific experiments and ways of using it. Vol. pipette also has higher accurately, but it is more precise than accurately for a dissolved solution, and it is the disadvantage that comes with measuring in vol pipette as it tends to measurements are more precise than acquired. Burette has the most advantage as it has higher accurate and precise values because it gives a high amount of control over the person's experiments but does not have the highest accuracy and precision but is closer to higher accuracy and person.

Conclusion: This experiment's purpose is to learn how to use the equipment to get to the most precise and accurate possible for future lab experiments. In the experiment, it was able to achieve through the process of measuring the same amount of distilled water in several types of glassware, such as the graduated cylinder, Vol. Pipette and Burette calculate the amount of parent error does each instrument and try to find the lowest percent error. In the experiment, the graduated cylinder was the instrument that had the lowest percentage error of other instruments because of the higher number of accessories it had in measurement. Most errors are acquired because of the amount of control over pouring the solution into the instrument as each one has a different level of control over the measurement. In the future to get the lowest percentage try to get more control over the handling of the solution during the measurement and use the equipment that has the highest accuracy and precision possible.