

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Coach's Name \_\_\_\_\_

### Instructions

Make sure to use the correct number of significant figures and units when you answer questions.

To complete a box titled "Measured", copy your measurement that you made in the previous week.

### Part A: Basic Measurement

1. Unit Conversions: Show your all work, including the correct use of conversion factors.

a. Convert the length of each object in the units of inch. Use the relationship of 1 inch = 2.54 cm (**exact**). Show your all calculations. (4 pts)

#### Length

	Measured in cm	Calculated in inch
Length of a test tube	9.70cm	

Calculations:

b. Convert the temperature of water in the units of Kelvin and Fahrenheit. Show your all calculations. (Total 8 pts; 4 pts each)

#### Temperature

	Measured in °C	Calculated in K	Calculated in °F
Temperature	20.5°C		

Calculations:

# CHEM 1451 Lab Week 03 Measurements Postlab Report

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Coach's Name Ashli Fureri

c. Convert the mass of each substance in the units of milligrams. Use the scientific notation in your answer. Show your all calculations. (4 pts)

## Mass

	Measured in g	Calculated in mg
Mass of 1 tablespoon of salt	3.33 g	

Calculations:

2. According to "Dietary Guidelines for Americans 2005" by the U.S. Department of Agriculture, the recommended maximum intake of sodium is equivalent to a teaspoon of salt. Using the relationship of 1 tablespoon = 3 teaspoon, calculate the mass of the recommended maximum intake of salt in milligrams. Use the answer from the question above. Show your all work here. (6 pts)

## Part B: Density

### 3. Density of water

a. Calculate the density of water. Show your all work here. (4 pts)

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Coach's Name \_\_\_\_\_

b. The density of water is tabulated according to its temperature in **Table 2** in the background and procedure file. Find the temperature in **Table 2** closest to the measured temperature of water that you used. Use the corresponding density of water as the reference value and calculate the percent error of the calculated density from the previous question. Show your all work here. (5 pts)

Measured temperature of water: 20.5°CDensity of water from Table 2 that you select (Reference value): 0.998 g/mL

Percent error: \_\_\_\_\_

✱ Calculations:

#### 4. Density of Chocolate

a. Calculate the density of each chocolate in g/mL. Complete the following table. Show your all calculations (Total 12 pts; 4 pts each)

Sample Number	1	2	3
Measured Mass of Chocolate	3.21g	1.99g	3.11g
Calculated Volume of Chocolate			
Calculated Density of Chocolate			

✱ Calculations:

**CHEM 1451 Lab Week 03 Measurements Postlab Report**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Coach's Name \_\_\_\_\_

**b.** Calculate the average of three measured values for the density of chocolate. Calculate the average absolute deviation. Show your all work here. (Total 8 pts; 4 pts each)

**5. Estimating the thickness of aluminum foil.**

**a.** Determine the thickness of each aluminum foil in micrometers. Assume that the density of aluminum is  $2.70 \text{ g/cm}^3$ . Show your all work including the correct use of conversion factors. (Total 15 pts; 5 pts each)

Sample Number	1	2	3
Thickness in $\mu\text{m}$			

Calculations:

**b.** Calculate the average of three measurements and the average absolute deviation. Show your all work here. (Total 10 pts; 5 pts each)

# CHEM 1451 Lab Week 03 Measurements Postlab Report

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Coach's Name \_\_\_\_\_

## Part C: Determine the Accuracy and Precision of the Medical Syringe

6. You will determine the accuracy of the volume measured by the medical syringe.

a. The density of water is tabulated according to its temperature in **Table 2** of the background and procedure file. Find the temperature in Table 2 closest to the measured temperature of water. By using the corresponding density of water and the measured mass of water, calculate the volume of water for each sample. Show your all work here and record the results in the table below. (Total 12 pts; 4 pts each)

Calculations:

b. Use the calculated volume as a reference value and calculate the % error of the measured volume for each measurement. Show your all work here and record the results in the table below. (Total 12 pts; 4 pts each)

Calculations:

Sample Number	1	2	3
Measured volume of water	10.01mL	10.01mL	10.01mL
Measures mass of water	9.70g	9.68g	9.63g
Calculated volume of water			
% error of volume of water			