

# THE DENSITY OF SOLIDS AND LIQUIDS

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

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

Station #: \_\_\_\_\_

**Objective:** (1) To become familiar with the various instruments used to weigh and measure objects  
(2) To determine the densities of solid objects and an unknown liquid.

**Procedure:** As in CHEM 1105 lab manual, pages \_\_\_\_\_.

**Observations:**

## Data Part 1: Density of Solids

Table 1. Part 1: Density of Solids: **Mass of Objects**

<b>Tray number:</b> _____	<b>Rock</b>	<b>Cylinder</b>	<b>Sphere</b>
Mass of object and boat using top loading balance			
Mass of empty boat using top loading balance			
<b>Mass of object using top loading balance</b>			
Mass of object and boat using analytical balance			
Mass of empty boat using analytical balance			
<b>Mass of object using analytical balance</b>			

Table 2. Part 1: Density of Solids: **Volume of Rock**

Volume of Water in Cylinder Before Adding Rock (mL)	Volume of Water in Cylinder After Adding Rock (mL)	So, Volume of water displaced (mL)	Therefore, Volume of Rock (cm <sup>3</sup> )

Table 3. Part 1: Density of Solids: **Volume of Regular Objects**

	Cylinder	Dimension	Sphere	Dimension
Dimension 1 by ruler				
Dimension 1 by caliper				
Dimension 2 by ruler				
Dimension 2 by caliper				
Dimension 3 by ruler				
Dimension 3 by caliper				

## Data Part 2: Density of Liquids

Table 4. Part 2: **Mass of Liquid**

Mass of 50 mL Erlenmeyer flask and stopper (g)	
Mass of flask, stopper, and first 15 mL aliquot (g)	
Mass of first <b>15.00 mL</b> aliquot (g)	
Mass of flask, stopper, first and second 15 mL aliquots (g)	
Mass of second <b>15.00 mL</b> aliquot (g)	

## Calculations:

Show all your calculations for Part 1 directly in the tables below.

Table 5. Part I: Density of Solids: **Volume of Regular Objects**

<b>Cylinder</b>	volume by ruler
	volume by caliper
<b>Sphere</b>	volume by ruler
	volume by caliper

Table 6. Part I: **Density of Regular Objects**

<b>Cylinder</b>	density using top-loading balance and ruler
	density using analytical balance and ruler
	density using top-loading balance and caliper
	density using analytical balance and caliper
<b>Sphere</b>	density using top-loading balance and ruler
	density using analytical balance and ruler
	density using top-loading balance and caliper
	density using analytical balance and caliper

### Table 7. Part I: **Density of Irregular Object-Rock**

Density of rock using top-loading balance
Density of rock using analytical balance

### Table 8. Part 2: **Density of Liquids**

Show all your calculations for Part 2 (Density of liquid) below. For which calculations to include see the "Treatment of Data" section in the manual.

### Conclusion:

Table 9.

Tray number: _____	Cylinder	Sphere	Rock
Calculated density from the most precise instruments			
Calculated density from the most precise instruments			
Calculated density of liquid			



3. A graduated cylinder, when filled to the 40.00 mL mark with water (density 1.00 g/mL) and capped with a stopper, had a mass of 352.05 grams. The same cylinder had a rock of mass 37.40 grams placed into it and was re-filled to the 40.00 mL mark with water. The same cylinder, when capped (with the same stopper) now had a mass of 383.95 grams. What is the density of the rock?