Name: _____ Date: _____

Title: The Concept and Measurement of Density

Purpose: To gain an understanding of the physical property of density. To gain skill in measurement of mass and volume, in addition to the construction of graphs and the physical interpretation of slope.

Procedure:
Part 1: Regular Solids

1. Use the metric ruler to determine the length, width, and height of the blocks to the nearest 0.1 cm.
2. Use the balance to measure the mass of each item listed above to the nearest 0.01g.

Part 2: Water Displacement – Metals

1. Obtain a 50.0 mL graduate cylinder and make sure that it is dry inside.
2. Obtain a metal and record the mass in the table.
3. Fill the graduate cylinder to approximately the 30.0 mL mark with tap water. Remember to read the bottom of the meniscus. This is the initial volume, $V_{initial}$.
4. Tilt the graduate to its side and slide the metal into the water. Note the final volume of the water, V_{final}.
5. Empty the contents of the graduate cylinder.
6. Repeat steps 2-4 for the other metals.

Part 3: Density of Brass

1. For each brass object, use the water displacement method to determine its mass and volume, as described in part 2.

Data:

Object (letter)	Length (cm)	Width (cm)	Height (cm)	Mass (g)

Sample	$V_{initial}$ (mL)	V_{final} (mL)	Mass (g)

Brass sample (#)	$V_{initial}$ (mL)	V_{final} (mL)	Mass (g)

Calculations:

Part 1 – Show how you determined the volume of the blocks here:

Block 1: Block 2: Block 3:

Part 1 – Show how you calculated the density of the blocks here:

Block 1: Block 2: Block 3:

Part 2 – Show how you calculated the volume of the metals here:

Metal 1: Metal 2: Metal 3:

Part 2 – Show how you calculated the density of the metals here:

Metal 1: Metal 2: Metal 3:

Part 3 – Show how you calculated the volume of the brass objects here:

Brass 1: Brass 2: Brass 3:

Part 3 – Complete the table below for the brass objects:

	Volume (mL)	Mass (g)
Brass #1		
Brass #2		
Brass #3		

On a separate sheet of paper, construct a graph of mass vs. volume for the brass objects. Use the numbers in the table above as your data points. When done, draw the best-fit line and describe the relationship between mass and volume.

Part 3 – Show how you calculated the density of the brass objects here:

Brass 1: Brass 2: Brass 3: