Density Blocks

Name: ________________________________

Date: __________________ Period:_____

Pre-lab: Length and Area

1. Scientific measurements can be estimated to the nearest one-tenth of the smallest mark on the measuring instrument. A ruler has a mark every 1 cm, so we can estimate to the nearest 0.1 cm. Also, the ruler has marks every 0.1 cm, so we can estimate even further to the nearest 0.01 cm.
2. Measure each of the lines to the nearest 0.01 cm using a ruler. Make sure to include units on your measurement.

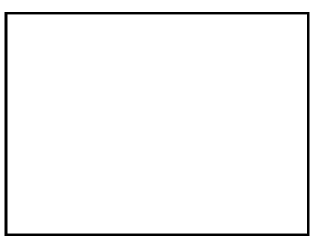
   Measure these line segments: **Answer:**

   a. ________________ ________________

   b. _____________ ________________

   c. ________ ________________

3. Use the ruler to measure the length and width of each of the rectangles below. Be sure to estimate to the nearest 0.01 cm.



Rectangle #1
Length: _____________
Width: _____________

Rectangle #2
Length: _____________
Width: _____________

4. Calculate the area of each rectangle by multiplying the length by the width. Round your answer to the nearest 0.01 cm.

   Area of Rectangle #1 ________________________

   Area of Rectangle #2 ________________________

Experiment #1- Density Calculation

Question:____

____

Hypothesis:____

____

Accurately measure the mass of the block using the triple beam balance. Use a metric ruler to measure the dimensions of the block. Then, use Equation #1 and Equation #2 to find the volume and the density of each block.

Equation 1:

Equation 2:

Data Table

Block Number				
Color of Block				
Mass (g)				
Length (cm)				
Width (cm)				
Height (cm)				
Volume Work				
Volume (cm^3)				
Density Work				
Density (g/cm^3)				

Collect Class Data

Block #	Density (g/cm^3)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

Analysis and Conclusion

Analysis:

Using the data you collected as a class, make a scatter plot on the graph paper.

1. The block number should be plotted on the x-axis.
2. The density should be plotted on the y-axis. Make sure to include the correct units.
3. Mark the density of each block on the graph to make a scatter plot. There will be no line of best fit!
4. Be sure to include a title using words from your x and y axis.

Conclusion:

1. Answer the question.

____

____

2. Using your graph, what can you tell about the density and the color of the block?

____

____

3. Which color block had the greatest density? ________________________

4. Which color block had the least density? ___________________________

5. You have two objects made of the same material. One is a cube and the other is a sphere. Will their densities be the same or different?

____

____

Density Blocks

Name: ________________________

Experiment #2 –The Measurement Challenge

1. Obtain a plastic block from the teacher that is different from any of the blocks that you used in Experiment #1. Record the following information.

Block #	Color of Block	Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)

2. Use the known density value and the volume calculated above to predict the mass of the plastic sample. Rearrange the density equation (Equation 2), to solve for mass.

Color of Block	White	Black	Milky-White	Clear	Gray
Density (g/cm^3)					

Predicted Mass of Block: _______________

3. When the mass of the plastic block has been calculated and a prediction made, use the electronic balance to measure the actual mass of the block.

Equation 3: Mass =

Actual Mass of Block: _______________

4. Determine the accuracy of the mass calculation by comparing the predicted (calculated) mass with the actual (measured) mass. Calculate the percent error (or difference) in the mass calculation using the equation below.

$$\text{Percent Error} = \frac{|\text{Calculated Mass} - \text{Actual Mass}|}{\text{Actual Mass}} \times 100$$

Percent Error =

5. How did your predicted density compare to the actual density?

____

____