Density Virtual Lab

Problem: Which item is the densest?
Information: density – mass per unit volume of a material (d = m / v)
Hypothesis: **If** we find the mass and volume of the all of the items, **then** the _____ will be the most dense.

http://academic.brooklyn.cuny.edu/geology/leveson/core/graphics/density/density_sim3.html

Density Lab Grading Rubric

Points earned	Possible points	Task
	2	Completed hypothesis
	15	Completed Data Tables
	5	**Units on measurements (in table)**
	6	Percent Error Calculations
	12	Conclusion questions answered in paragraph form
	10	Analysis Graph(s) of Densities
	10	Conversion Calculations
	60	TOTAL POINTS

Procedure:

1. Go to the web site listed above
2. Use the virtual lab to find the mass and volume of each mineral.
   a. Select mineral
   b. Note initial volume of graduated cylinder on left side of screen
   c. Click immerse the mineral (near center of screen)
   d. Note final volume of graduated cylinder on right side of screen
   e. Final Volume – Initial Volume = object volume
   f. Click weigh the mineral and record weight from triple balance beam.
3. Calculate the density of each object (d=m/v)

Observations: Use the data tables on the worksheet provided to gather your data.
Analysis: Create bar graph(s) showing the results of the data gathered. **(Bar graphs of your DENSITY values)**
Percent Error:

Calculate the percent error for the density of water and copper? (SHOW CALCULATONS)

$$\textit{Percent Error: } \frac{|\textit{experimental density} - \textit{known density}|}{\textit{Known density}} \times 100$$

Conversion: Select one minerals and convert the measurement of its mass from grams to megagrams (Mg). Select one of the minerals and convert its volume from mililiters (mL) to picoliters (pL). Show both conversions using dimensional analysis with units.

Conclusion: Answer the following questions in **paragraph form.**

1. Which item was the densest?
2. Which item was the least dense?
3. How did the results compare to your hypothesis?
4. Do you think that the any of the minerals were the same? Explain.
5. How do your calculations of the density of mineral #12 and 19 compare to the known values?
6. Did any of the results surprise you? If so, in what way?

Name _____ Date _____ Period _____

Density Virtual Lab

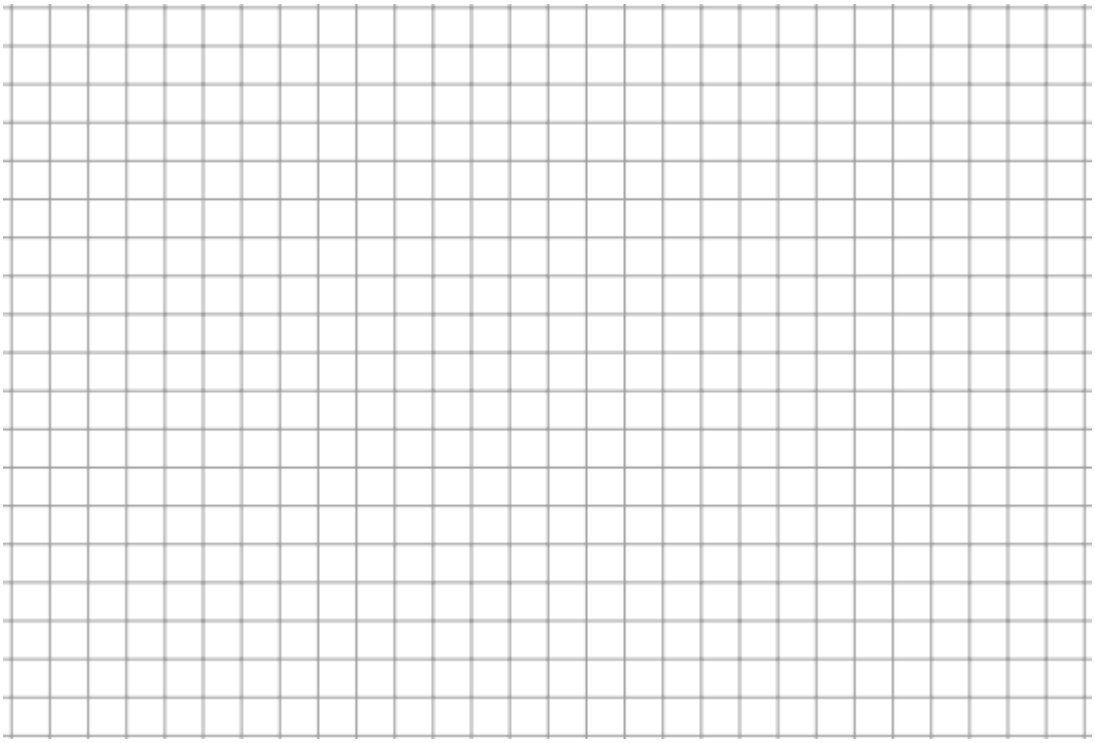
Hypothesis: _____ will be the densest object.

Data table:

Vf - Vi = volume object density = mass / volume of object

Item description	Volume of Water [Vi]	Volume of Water + object [Vf]	Volume of object	Mass	Density	Known Density
Mineral # 12						0.445 g/mL
Mineral # 6						
Mineral # 9						
Mineral # 21						
Mineral # 13						
Mineral # 24						
Mineral # 19						0.186 g/mL
Mineral # 113						
Mineral # 112						

Analysis: Create bar graph(s) showing the results of the densities for each of the items tested. Make sure to number/label your axis.



Percent Error Calculations:

$$Percent\ Error: \frac{|experimental\ density - known\ density|}{Known\ density} \times 100$$

Mineral # 12:

Mineral # 19:

Conversion Calculations:

object #_____ objects mass: _____
Conversion:

object # _____ objects volume: _____
Conversion:

Conclusion: Answer the following questions in **paragraph form.**

1. Which item was the densest?
2. Which item was the least dense?
3. How did the results compare to your hypothesis?
4. Do you think that the any of the minerals were the same? Explain.
5. How do your calculations of the density of mineral #12 and 19 compare to the known values?
6. Did any of the results surprise you? Why?