Laboratory techniques and measurements

Laboratory Techniques and Measurements Choose any three objects that are shorter than the metric ruler to measure, such as a CD, Key, spoon etc. OBJECT| LENGTH (cm)| LENGHTH (mm)| ruler| 30. 5 cm| 305 mm| thermometer| 15. 1 cm| 151 mm| pencil| 16. 7 cm| 167 mm| Warm Temperature Measurements * Fill a 100 a 100mL beaker with 50mL of hot water. Get the water as hot as possible. * Use thermometer to measure the temperature of the water in the beaker using Celsius unit. Record measurement in Data Below. * Place the beaker of the water on the wire gauze burner stand. * Remove the cap from the burner fuel and set aside.

Light the fuel and slip it under the burner stand. * Bring the water to full boil and record its temperature. Record the measurement in data below. * Let the water boil for about 5 minutes. Record the measurement in data below. Cold Temperature Measurements * Allow the 100 mL beaker to cool. Fill the beaker with cold tap water and then record for the water temperature Data below. * Prepare an ice water bath by adding ice to the beaker filled with cold tap water. * Immerse the thermometer in the ice bath and stir gently. Record the temperature Data below. * Let the ice water stand about 5 minutes.

Then record the temperature in Data below. Hot water from tap (Celsius)| Boiling Water (Celsius)| Boiling water- 5 min| 51| 103| 103| Cold water from tap(Celsius)| Ice water (Celsius)| Ice water-5 min| 5| 0| -2| Volume Measurement * The curved surface of the lid in a glass is cylinder is called the meniscus. * Fill a small test tube with water. * Pour the water from the test tube into the 25 mL graduated Cylinder. Record the volume of the water below. Empty the graduated cylinder. * Determine the volume of a thin –

stemmed pipet: a) Completely fill a clean, empty pipet with water.) Hold the pipet vertically multiple times to expel all the water into the graduated cylinder and return it to its auxiliary bag. Record the volume reading of the graduated cylinder in Data Table 3. Data Table 3 Test tube (mL)| Number of drops in 1 mL| Pipet volume (mL)| 10| 27| 4| Mass Measurements * Choose seven objects to measure. * Record the hypothesized mass of the first object. Record the measurement in Data Table 4. * Repeat the previous steps for each of the remaining objects. Did your hypotheses become more accurate with practice? Data Table 4 Object| Estimated Mass (g)| Actual Mass (g)| en| 7g| 5. 7g| screw| 15g| 8. 1g| cylinder| 18g| 16. 5g| calculator| 310g| 255. 4g| portable phone| 150g| 127. 3g| Google| 62g| 53. 6g| book| 450| 485. 3g| Density Measurements * Record all data table similar to Data 5 shown below. * Calculate the density of water. Data Table 5 Hypothesis: The density of water greater than water Data Table 5 | Mass A| Mass B| Mass A-B| | | Object| Graduated Cylinder+ Substance| Graduated Cylinder| Substance| Substance Volume| DensityM/V| Water| 24. 6g| 16. 5g| 8. 1g| 5mL| 1. 62| Isopropyl alcohol| 24. 3g| 16. 5g| 7. 8g| 5mL| 1. 56| Saturated salt| 25. g| 16. 5g| 9. 1g| 5mL| 1. 82| Density of irregular objects * Calculate the density of a small, irregular metal object using the water-displacement method. Record the results in a Data table 6. Data Table 6 | A| B| B-A| | | Object| Graduated Cylinder Volume| Graduated Cylinder + Object| Object Volume| Object Mass| DensityM/V| Metal bolt- Water displacement method| 12. 5mL| 13. 5mL| 1mL| 8g| 8| Metal bolt -Archimedes' Method| | | 0. 029| 8g| 8. 3| Magnet -Water displacement method| 12. 5mL| 13. 5mL| 1ml| 6. 3g| 6. 3| Magnet – Archimedes'Method| | | 0. 035| 5. 2g| 6. | Magnet –Math calculation Method| | | . 625| 6. 3| 10| Making a dilute solution * Delivering 5mL Gatorade in the

volumetric flask. * Slowly add tap or distilled water just below 25mL on the volumetric flask and then use the short stem pipet for the last few drops so total volume is exactly 25mL * Record observation in the Lab Report. The darkest color was on the bottom, but all the color to the top was even. Questions A. One of the reasons is the altitude. Due to the lower atmospheric pressure, water boils at a lower temperature at higher altitudes. B. (102-100/100)*100= 2% error (99. -100/100)*100= 0. 8% error C. 1. 20 g/cm3 15g of this piece of gold displaces exactly 1 cm3 D. 1. 35mL E. water displacement, would be more accurate for irregular objects, regular objects both methods are good. F. The measurement displayed on the digital scale would be incorrect. G. Archimedes' Principle H. It is not gold. I. Molarity = (moles of solute/liters of solution) 1 Mole/1Liter = 1 Mole/1000mL = 1M 1 mole/4Liters = 1 mole/4000mL = 0. 25M You would need to add 3000 mL of water to your solution. Mix it, and then draw out 10 mL You can use 1 mole of HCL, and 4000 mL of distilled water